THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXV. No. 1924.] LONDON, MARCH 27, 1900. [52ND YEAR. PRICE 6d.

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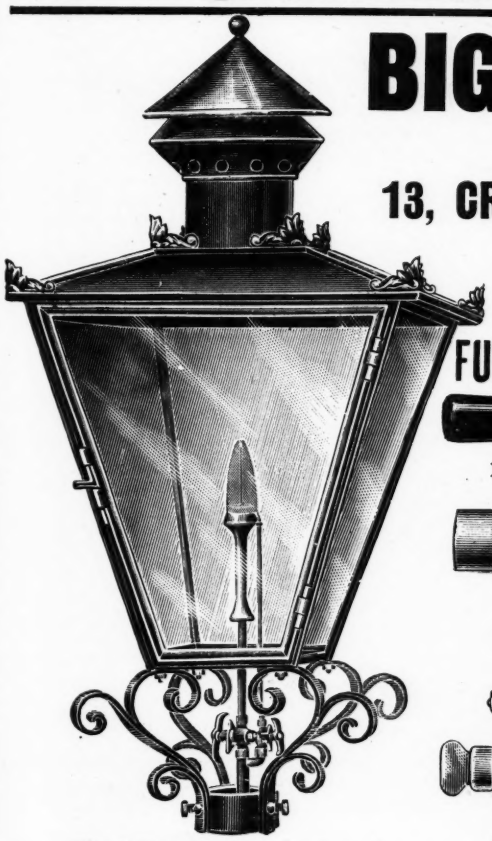
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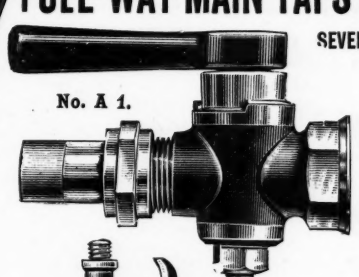
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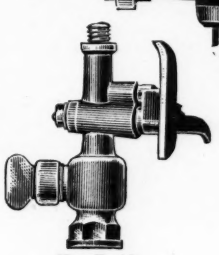
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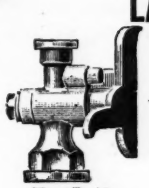
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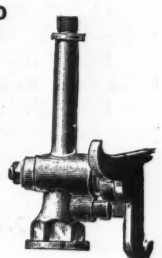
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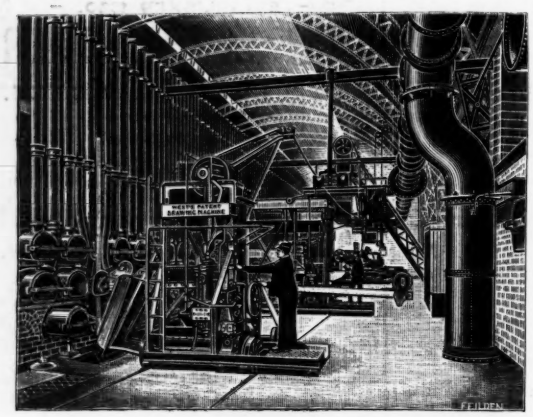

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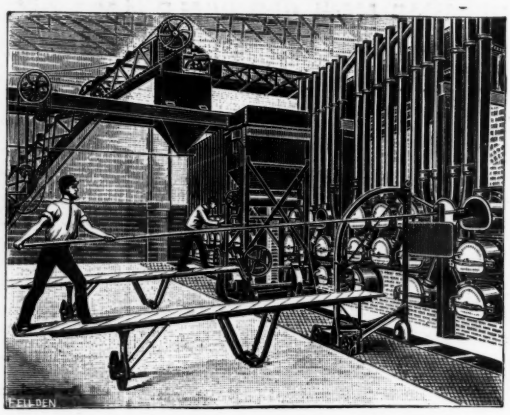

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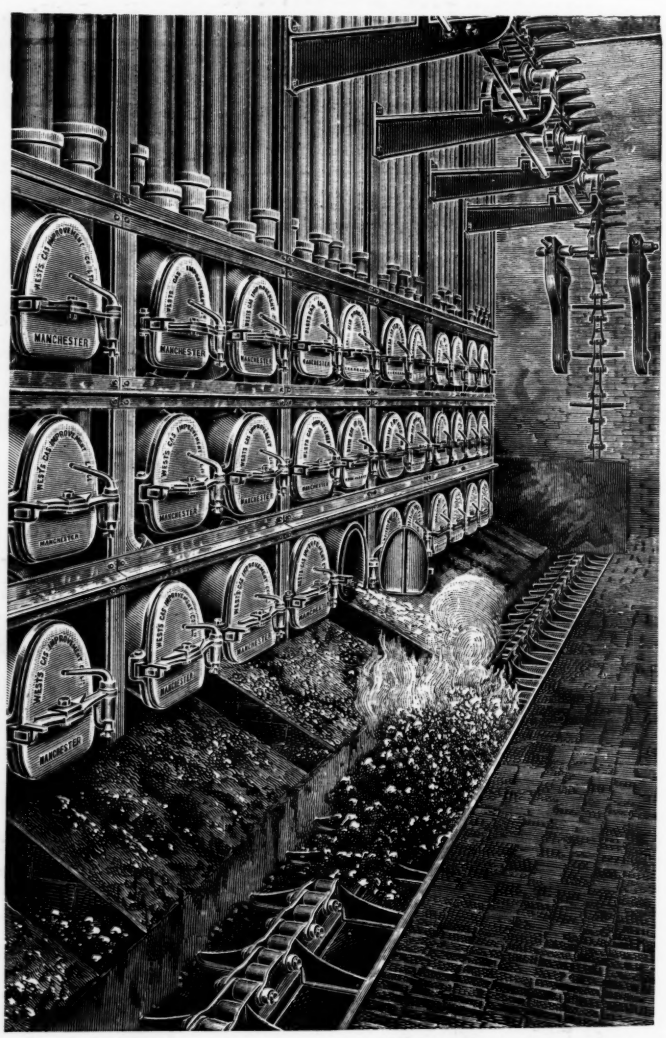

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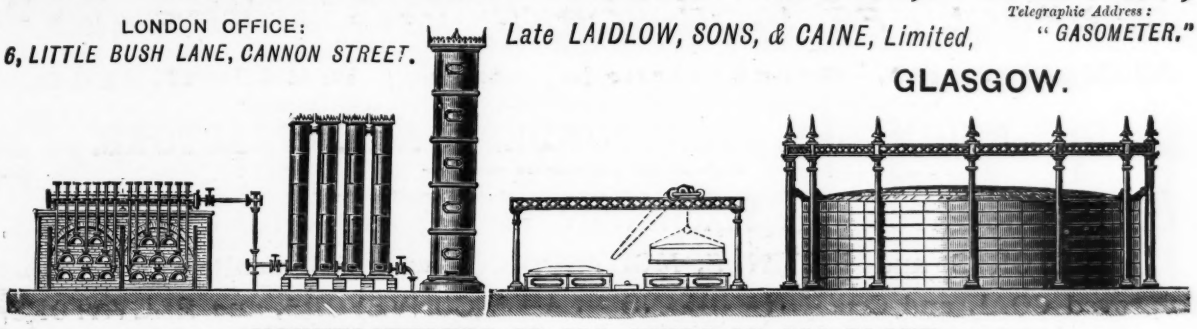

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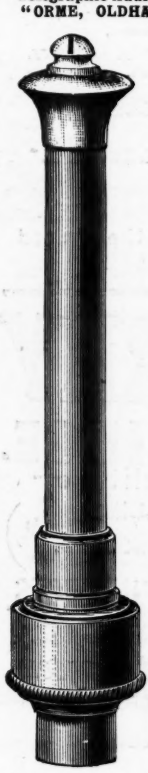

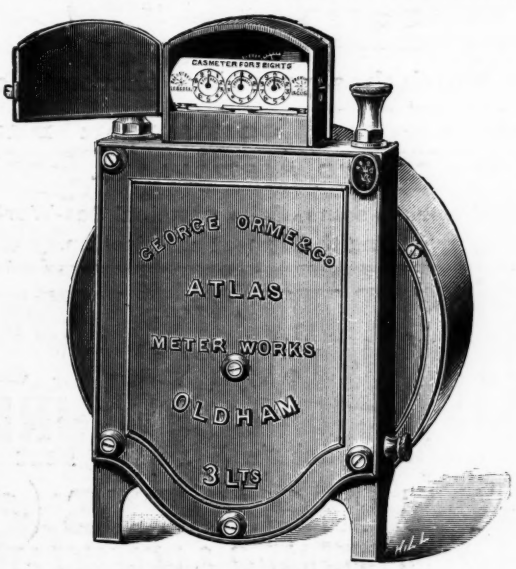

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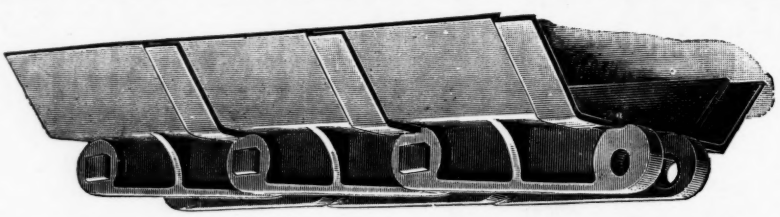

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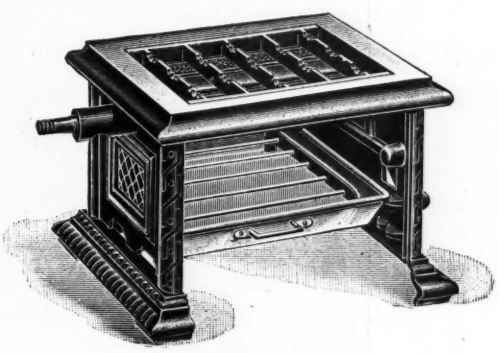

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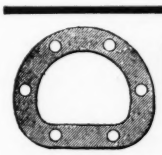

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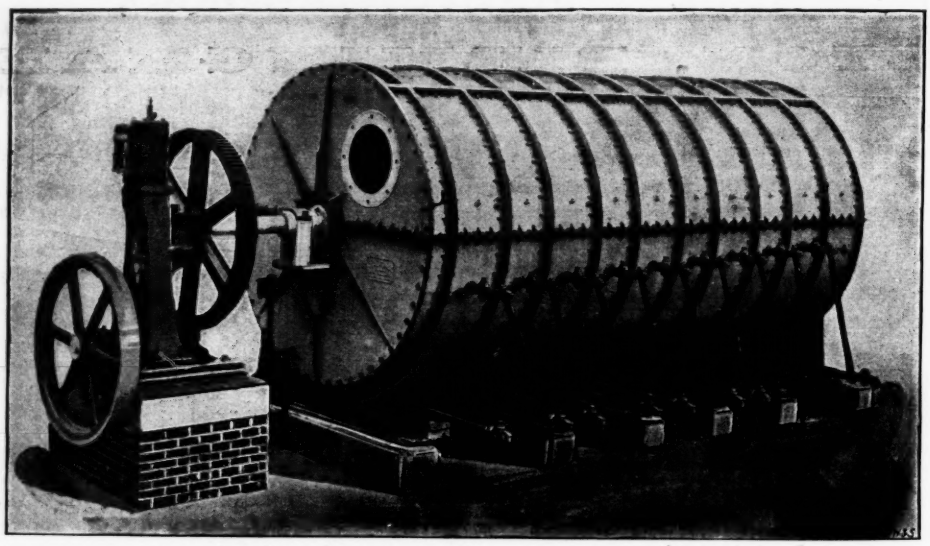

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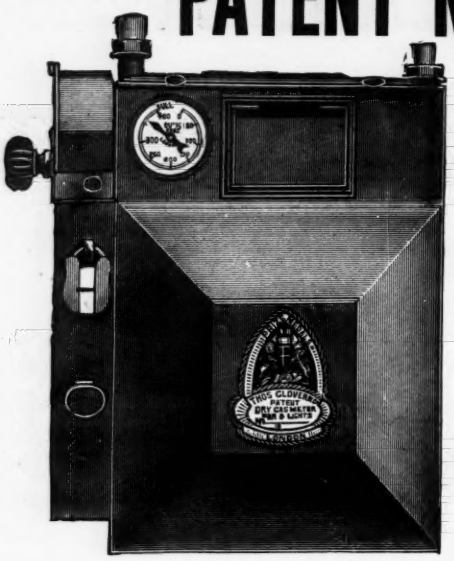

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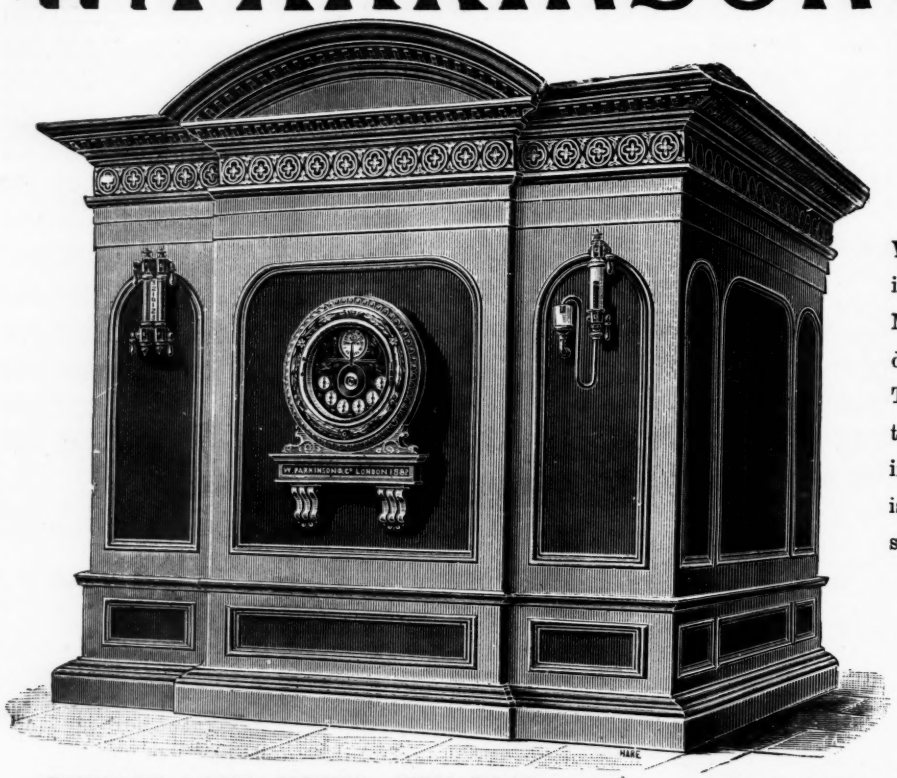

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EDITORIAL NOTES.

Municipal Trading.

IT has been announced in the House of Commons that the appointment of the Committee on Municipal Trading will be taken this week; and there are indications that the avowed policy of the Progressive Party in this regard will receive sharp criticism. At the last monthly meeting of the London Chamber of Commerce, a short but pithy paper on the subject, by Lord Avebury—better known as Sir John Lubbock—was read by Mr. Charleton. This paper set forth that the indebtedness of British Local Authorities already much exceeds 100 millions sterling; and that if the present craze for Municipalism continues, it will rapidly assume more gigantic proportions. In Municipal Bills now before Parliament, powers are demanded for undertaking such diverse businesses as banking, pawnbroking, coal supply, saddlery, telephones, tailoring, manufacture of electrical fittings, of the residual products of gas, supply of apparatus for games, Turkish baths, cold-air stores, refrigerators, estate agency, printing, and constructing lifts. This is all very well; and nobody has ever yet attempted to draw the line between what is strictly proper to municipal enterprise and what should be left to private effort only. Every case must be decided on its merits; and it would be absurd to condemn any municipal project simply on the classification. The position taken up by Lord Avebury on the general question, however, is, if we may say so, very much the same as that defined long ago in these columns. There is so much for British Municipalities to do, and their financial resources are so limited, that it is a great pity when they fritter their powers away in mere huckstering speculations, instead of reserving them for things really worth the doing. As between trading and administration, there is a choice which we should like to see more generally exercised by English Municipalities in favour of the better part. By grasping after "profits," they are bound to let go the reins of good local government. The Mayor's chain of office ought not to be utilized to support the chandler's apron. It is for this reason that those statesmen who are able to see an inch beyond their nose deplore the obsession of Municipalities by the trading idea.

Municipalities, in short, should be reminded of the guiding principle that their first duty consists in doing what no other organization could do for the public. Of late years, under the sway of Progressivism, the contrary principle has become fashionable—that as soon as anybody has succeeded in showing that certain services are worth rendering, the Municipality should step in and monopolize them. And the new Manchester School maintain that, whenever a Municipality have gone into any line of business, no sort of competition in regard to it should be permitted by law. This is the state of things in respect to municipal trading that has already been signalized by the Association of Municipal Corporations. How much farther is it to go?

Meanwhile, it is gratifying to note that "The Times" has lent its powerful advocacy to the immediate reform long advocated in these columns—the proper statement and auditing of municipal accounts, "such as will enable "the public to understand whether or not an experiment "is a failure or a financial success." Our Progressive Local Authorities have not yet gone the length of the highly democratic Municipality of Paris, who have just voted their yearly Budget in secret session, so that the public should not know how the money goes; but we have only too many cooked municipal balance-sheets, which are nearly as bad. As "The Times" puts it: "At present "we are generally dependent on the report of a Com- "mittee probably more or less responsible for the experi- "ment, and little likely to be courageous enough to state "that which might make them unpopular." We are glad to mark that the same authority has learnt the lesson that this municipal juggling with figures is frequently displayed in connection with lighting. "In comparing the costs "of two systems of municipal lighting, for example, any "results can be extracted if the financial artist is free to "deal as he likes with depreciation and depreciation funds, "and to make all sorts of assumptions as to the superior "quality of the commodity offered by Municipalities."

Truly, after this, the "JOURNAL" and Professor Smith ought to feel that they have not been altogether as voices crying in the wilderness.

It should be a sufficient engagement for all candidates for municipal honours to declare their intention of having a fair, complete, and reliable audit of Corporation accounts. Happily there is not, in the United Kingdom, any present reason to fear the introduction of the "spoils" system of municipal administration, which is the canker of American democratic government. It is ignorance, heedlessness, prejudice, and incompetence that are to be dreaded. The only check upon Municipalities is a full disclosure of the consequences of ill-advised schemes. "A Corporation "which has traded foolishly does not go into the Bank- "ruptcy Court; and the only way of stopping wasteful "enterprises is to subject accounts to impartial supervision. "Much has of late been said as to the right of Corporations "to compete with private individuals in the supply of gas, "water, &c. What is much more likely to be lost sight "of in these days, is the expediency of keeping a foothold "for the private individual or company offering the same "services as Corporations."

It all comes back to the general ruling, that these municipal adventures are to be judged on the ground of expediency; but the immediate duty of Parliament is to prevent insistent Progressivism from shifting the onus of proof of the advantages of Municipalism. To permit certain Municipal Corporations to do particular things because there is nobody else on the spot to do them so well, is a far different matter from the tacit acceptance by Parliament of the "right" asserted by the partisans of Progressive Municipalism to the preferential place in the same order of affairs. The great need is to 'ware "principles." Let the proof of the pudding be in the eating; and ensure that the public, who pay the cooks and maintain the kitchen, shall have an opportunity of tasting the product. Municipalities constantly need reminding that high professions do not excuse poor performance. They usually flatter themselves that they manage their business better than private owners; but the balance of evidence is just the other way. Not to touch upon the case of gas, water, or electricity supply, as to which we might be regarded as prejudiced, what is the record of the very latest, and by far the greatest, of municipal undertakings—the better housing of the poor of towns? In the matter of lodging-houses, the London County Council is a bad second to the Rowton Houses; and at Shoreditch the other day, Lord Rosebery satirically complimented the Vestry on having provided accommodation for 300 families, after having dispossessed many more. And the whole thing was done in such a style that the Vestry had to refuse the very much higher rents offered by other applicants than those for whom the buildings were intended. Well might Lord Avebury ask if this proceeding is housing, or dishousing, of the poor. And very much stronger is the general conclusion from all these considerations, that our Municipalities have immense responsibilities and problems to solve, which are enough to tax all their energies and to absorb all their resources, without their going aside to play in the fields of private enterprise.

Progress of Private Gas Bills in Parliament.

THE Committees on Private Bills have made good progress during the past week with the controversial Gas Bills submitted to them. There is not a great deal to comment upon in the settlements actually effected; and all the heaviest Bills are standing over. In the case of Morecambe, a rather curious point arose in consequence of the unusual circumstance that the outlying district of Heysham claims to have a bigger future than the present predominant partner in the gas undertaking. Something similar has been the cause of trouble in the experience of Glastonbury, which is held in suspense until an acceptable solution of the matter is formulated. This is a difficulty that may possibly be met with more frequently in future. Modern trade and industry is careless of old municipal boundaries; and when any new seaports, or new manufacturing centres, are founded in obedience to commercial conditions, it is too much to expect that they should be content to bind themselves for ever to the government of stationary Municipalities. The Hartlepool Gas Company have preserved their independent existence. Cleethorpes has passed safely through the Lords, at the cost of shedding an excessively high standard price. After the Easter recess—which it is generally understood this year begins unusually early, and lasts unusually long—the big Gas Bills will rivet professional attention upon their most portentous proposals.

Gas Troubles in Dublin.

THE Alliance and Dublin Consumers' Gas Company have been in trouble once more—and again through no fault of their own. The outward and visible evil this time was a lawsuit between the Company and the Corporation in regard to steam road-rolling. The Company had to seek an injunction against the Corporation, and also claimed damages for injuries actually sustained. The latter, of course, was a comparatively small matter; the injuries so far having been of trifling amount. The question of restraining the use of the Corporation rollers in such a manner as to cause further damage to the Company's distributing plant was of a differe nt character. The Irish Master of the Rolls found that, as a matter of fact, certain main-breakages were caused by the Corporation roller; and the chief defence set up by the Corporation was the familiar one that the mains and pipes were unduly near the surface of the road. The question of law then arising was as to what should be regarded as a proper and sufficient depth for the mains. The Court answered that this must be such that the mains and pipes would be free from injury by ordinary traffic in the district in which they are laid. Steam-rolling, although lawful in itself, is not ordinary traffic in the circumstances shown to exist in this instance. The pipes were laid upwards of thirty years ago; and they stood the ordinary usage of the roads, without a single failure, until the steam-roller appeared on the scene. This settled it. The Court paid more heed to the test of thirty years' use than to all the expert evidence tendered as to what ought to have been done. The dictum of the Master of the Rolls on this head is worth registering. He said: "The law applicable to the case admits of no dispute. A "person who uses a public highway is bound to do so with "due regard to the rights and interests of others. If he "employs for his own purposes a vehicle of unusual or "extraordinary weight, or one carrying unusual and extra- "ordinary loads, he does so at his peril; and that even if "the use of such a vehicle is not in itself a nuisance or "otherwise unlawful." His Lordship added to this declaration a useful warning that neither highway authorities nor gas companies can do as they like with a public road. The injunction was granted, as prayed.

The Company were also dragged before the bar of public opinion for increasing the death-rate of Dublin by distributing an abnormal proportion of carbonic oxide with their gas. Mr. T. M. Healy asked a question in the House of Commons on this subject, and received a reply of the usual official character. It was Professor Emerson Reynolds, of Trinity College, who first raised the alarm of gas poisoning; he having in the course of a lecture declared that the proportion of carbon monoxide in Dublin gas had increased steadily of late, until on the 7th inst. it reached 12·6 per cent. This analysis showed, said the Professor, that the Company must have been turning carburetted water gas into their mains; and the conclusion was confirmed on inquiry of the Company. The circumstance of the Company having only just begun the manufacture of carburetted water gas before Professor Reynolds detected its presence, is a good testimonial to the vigilance exercised in the chemical laboratories of Trinity College; but there is some reason to believe that closer investigation would reveal a lack of agreement between the indications of analysis and the proportions of carburetted water gas actually made at the works. Professor Reynolds said that this product is much cheaper than coal gas—thus suggesting that it is to the interest of the Gas Company to make a large and possibly a preponderating quantity of it. But this, again, is a conclusion which would very probably be dispelled on fuller inquiry.

Result of the Shrewsbury Gas-Mains Arbitration.

THE interesting, and in many respects important, Shrewsbury arbitration has resulted in an award substantially for the Gas Company. The proceedings have been specially reported in the "JOURNAL" (see *ante*, pp. 549, 685). The matter in question was the amount of damage (if any) which had been sustained by the Company by reason of the exercise of the statutory powers vested in the Corporation for carrying out sewerage works in the borough. Action was taken under section 308 of the Public Health Act. The injury complained of was to the gas mains and

pipes in the roads opened for the sewerage works. Some of these trenches were very deep; and the consequence was that pipes were caused to settle, joints were drawn, and the gas-distribution plant generally was so affected that there was much leakage. The trouble dates from 1896; and a claim was made by the Company on the Corporation for ascertained damage up to 1898, when the sewerage contract was finished. This was partly satisfied by the Contractor. Ever since, however, the existence of injury to the distribution plant has continued to manifest itself by a greatly increased loss of gas not accounted for. During the years previous to the commencement of the sewerage operations, the percentage of unaccounted-for gas was between 5 and 6. Subsequently, it rose to between 8 and 9 per cent.; and the Company had to do a great deal of additional work to reduce this extraordinary loss. They accordingly claimed £1583 from the Corporation—the amount being made up of money spent on repairs, and the value of lost gas, which was charged at the selling price of 3s. per 1000 cubic feet. This was not the right thing to do; the proper charge unquestionably in such cases being that at which the lost gas could be made good by the Company. So the Umpire (Mr. James Mansergh) seems to have held. He decided that the fact of the damage to the Company's property was proved; and he has assessed the compensation to be paid by the Corporation to the Company in respect thereto at £930. The Corporation are to pay to the Company three-fourths of their costs of the reference, the whole of the costs of the award, and all their own costs upon the reference. This is doing substantial justice to the Company; and, of course, the ratepayers are both sad and sorry about it. They talk of the award costing the town £2000; and they contemplate ruefully the imposition of a special rate of 4d. or 5d. in the pound to pay for it, unless the Corporation are able to persuade the Local Government Board to allow them to charge it to the capital account of the sewerage works.

The particular and local aspect of the matter is not of any very special moment to our readers; but what is of real importance is the record that so adequate a remedy exists for a continuing injury of the kind in question at Shrewsbury. It is always to be regretted when those who have to live together—as Corporations and Gas Companies—are compelled to go to law with one another. It is as bad as litigation between partners in the same firm. Where the question at issue is one of damage to gas-mains, however, the owners of this class of property must take measures for their own protection. The consequences that may ensue upon the causing of external injury to gas-pipes in roads are so serious and far-reaching, that sewerage operations, road-rollers, thoroughfare improvements, and so forth, are bound to be very carefully watched by those responsible for the gas supply. The Shrewsbury case incidentally illustrates the value of keeping exact records of the data of gas distribution. As this had been carefully done, the only room for dispute was as to the amount of the compensation due for the disturbance of the old state of affairs. If the Corporation had confined their opposition to the question of the price of the lost gas, they would have saved their costs. Instead of this, they forced the Company to prove every material fact, and gave the Court a good deal of unnecessary trouble in hearing and sifting evidence as to the gas-mains being bad in places not affected by the sewerage operations. Indeed, Mr. Mansergh was constrained to protest against himself and his colleagues having to investigate these petty allegations. The mistake has cost the Corporation dear. But it was their way of fighting the case; and they must bear the consequences.

The Good and Bad of the Parliamentary Week.

It is a mere truism to characterize the House of Commons as an astonishing institution; but really no other qualification so properly fits its record for the past week. On Wednesday the House did an exemplary afternoon's work. It did something to remove a long-standing injustice to British shipowners, and continued in the path of well-doing by reading a second time a Bill to extend the Workmen's Compensation Act to agricultural labourers. The House agreed to this extension, in principle, without a dissentient voice; and the Bill was duly remitted to the Grand Committee on Trade. The only sound objection to the measure lies in its piecemeal character. Those who have believed in the principle of workpeople's compensation for injuries suffered in the course and by reason of their ordinary employment, have never willingly drawn the line between different occupations. If a course is right, it ought not to be upheld with limitations. All the same, practical men of the world know that universally desirable things can generally be most expediently obtained by instalments. As regards the great innovation of workmen's compensation, the procedure of the introducers of the Act in 1897 was a remarkable blend of boldness and prudence. They saw the danger of failure in attempting too much at a stroke; and accordingly they proposed to legislate by stage. Still they made the Act applicable to the most dangerous and best organized employments. Thus literally it was the first step that cost the most. The indefinite extension of the law of compensation is admittedly only a question of time and opportunity; and there is much fitness in the first enlargement being to include agricultural labour—the fountain and origin of all forms of toil. The agricultural labourers have not had to wait long for this recognition of their claim to be included among the best favoured of workers. The exaggerated fears of some employers of labour as to the cost of insurance under the Act have already subsided. It would have been fatal to the prospects of the Bill of 1897 to have added the cry of the farmers to the protests of the colliery proprietors; but now the latter can smilingly extend the hand of brotherhood to the agricultural employers. It will scarcely come to a penny postage stamp a week to insure the farm hand. And what a difference to him!

Of course, as being part of the game of party politics, the Opposition members and newspapers affect to regard the passing of the Bill with the assent of the Government as a wholesale conversion. "Three years ago, when the "Workmen's Compensation Bill was under discussion, "efforts made by the Opposition to include the agricul- "tural labourer were resisted alike by the Government "and their supporters. Now there is absolute unanimity "in supporting it." Certainly, for reasons already shown. All this "Codlin and Short" politics is beside the mark. Sir James Joicey spoke out like a man in the course of the discussion, confessing that many of the dangers anticipated from the original Act had not arisen. The Home Secretary handsomely admitted that the Act itself calls for some revision and extension; and every member who took part in the debate worthily maintained the credit of the House.

But what a change came over the same scene next day, when the formal order for the second reading of the London County Council's Water Bills was made the pretext for turning the House into a bear-garden! The authority of the Chair was set at naught; the Leader of the House had to be sent for—like a schoolmaster summoned to stop a fight in the playground—and the aspirations of the Progressive majority of the London County Council were nipped, all because the Irish members wanted the whole day to talk about an abstract resolution relating to the burden of Irish taxation. The unseemly squabble lasted longer than would have sufficed to dispose of the Bills in the order in the proper way. An extraordinary way of doing legislative business, indeed! The unkindest cut of all for the London Progressives was that this snub should have been administered by their quondam colleagues in politics. Underneath the immediate reproach, however, lies a serious menace to the reputation of Parliament as the custodian of national industrial interests. The practice of putting down Private Bills for their regular stages irrespective of all other parliamentary business is of long continuance; but it will have to be reconsidered if the growing fashion of discussing these Bills for thinly-veiled political objects is carried much farther. Every session sees the whole legislative machine blocked time and again, because some honourable member chooses to wreak his own purposes upon a Private Bill which a few years ago would have been sent upstairs as a matter of course. The case was different on Thursday; but the trouble was the same. Possibly these displays of spitefulness, or ineptitude, are properly referable to the senility of the present House of Commons. If this is the true interpretation of the phenomena, it is consoling to think that there must be a new Parliament before long.

The Coal and Oil Markets.

The preliminary figures relating to the output of coal and other minerals in 1899, published by the Home Office,

will be found to-day on p. 820. The statistics now published fully confirm the opinion more than once expressed in the "JOURNAL" that the scarcity of coal during the past winter was due to other causes than that of short output. The total quantity of coal raised during the year was no less than 220,085,303 tons, as compared with just over 202 millions in both the preceding years. Before 1897 the output had never reached 200 millions. The tonnage for 1899, therefore, exceeded all previous records by close upon 9 per cent. In face of such figures as these (which will come as no surprise to our readers, the estimated output for last year having been given as 225 million tons in these columns at the very beginning of January), the explanation put forward for non-delivery by many contractors—that they were being seriously hampered by the bad working of the men, and consequent short output—does not appear now, any more than it has ever appeared to us, very convincing. Moreover, it is to be observed that, while the output increased by 9 per cent., the number of men employed by the collieries was only 3 per cent. higher—the obvious inference being that the men worked better, not worse, in 1899 than in former years. That this was the case is shown by the fact that the output per man employed (calculated from the Home Office figures) was 302 tons per man last year, 286 tons in 1898, and 201 tons in 1897. Where, then, did all the coal go; for there was no doubt about the scarcity during the mid-winter months? About 7½ million tons more went abroad last year than in 1898. The balance of the increased output—*i.e.*, 10½ million tons—must have been consumed in this country, and something more; for stocks all round, alike at collieries, gas-works, and elsewhere, at the end of the year, were abnormally low. The consumption of coal at home must, indeed, have increased something like 12 to 15 per cent. last year, which is a very striking demonstration of the activity of every branch of trade; for the coal requirements form a sure barometer of the country's prosperity.

There are, moreover, no signs of any less quantity being required this year. Indeed, present conditions point to an even greater demand upon our coal resources; for not only does the export coal trade maintain and increase its volume, and the activity in the iron and allied trades continue, but, further, it must be remembered that a very considerable quantity will be required from the collieries to enable users to make good, to some extent at any rate, their depleted stocks. Very few gas managers would, we take it, care to run the risk of having again to cut things so very fine as many of them have had to do this winter. One would, in fact, be inclined to hazard the opinion that the quantity of coal required to be raised during the present year in order to supply the home and foreign markets, and to make up and maintain stocks at something approaching normal figures, will not fall far short of 235 million tons. Upon the question of whether the collieries will try—or, if they try, be able—to turn out this quantity, will largely depend the prices that will rule during the year.

We are not surprised—neither will managers who are looking to their carburetted water-gas plant for salvation next winter be pleased—to learn that the oil market is rapidly hardening in sympathy with the general situation. Prices 50 per cent. higher than before, and not much oil to be had at that, is not a great encouragement to the Gas Company contemplating an installation or extension of carburetted water-gas plant. Manufacturers of such plant will have to find some means of ensuring supplies of oil at reasonable prices if they are to make much headway among the Gas Companies in this country. We do not want to have to put up coal-gas and water-gas plant side by side, and use one or the other according as coal or oil is the cheaper. Cheap fuel may be too costly if it requires dear capital to procure.

WATER AND SANITARY AFFAIRS.

THE perpetration of "another injustice to Ireland" gave rise last Thursday to probably the most disorderly scene which has been witnessed in the House of Commons this session. As our readers are aware, the two Water Bills of the London County Council and the Bill of the associated Water Companies were down for second reading, "by "order," on that day; and a numerously signed "whip" had been issued to remind members of the fact, and to ensure as large an attendance as possible. It was perfectly well known that the Bills would be opposed at this stage; but it was thought that their fate for this session would be practically settled by the debate which would arise. Unfortunately, the Government had arranged to let the Irish members have last Thursday as a field-day for the discussion of the financial relations of this country and the Sister Isle, subject, of course, to the prior disposal of the private business, which, in accordance with the practice of the House, always takes precedence of public matters. The appearance of three contentious measures upon the paper, and the possibility of a long debate arising thereon, alarmed Mr. Redmond, the Member for Waterford, who saw in this circumstance an encroachment upon what he and his party regarded as time specially set apart for their use. Consequently, as soon as the order for the second reading of the Council's Purchase Bill was reached, he explained the nature of the arrangement which had been come to, and appealed to Mr. Stuart, who had charge of the measure, not to proceed with it. The latter was naturally reluctant to give way, as his two Bills were down "by order;" but he expressed his willingness to place himself in the hands of the House. When, however, he attempted to submit his motion, he was interrupted by shouts of "Divide" from the benches below the gangway. Then followed for the space of an hour a scene which was simply a disgrace to an assembly of legislators. Eventually, during a lull in the uproar, Mr. Stuart managed to convey to the House the fact that he was prepared to assent to the postponement of the debate; and he asked for a statement of the views of the Government on the point. Mr. Chaplin did not at first feel justified, in face of the coercion attempted by the Irish members, in assenting to Mr. Stuart's suggestion; but the timely arrival of the First Lord of the Treasury led eventually to the adjournment being agreed to. The whole proceeding was a striking example of the methods employed by the Irish Party. They never scruple to waste time by unseemly interruptions; but they are ready to fight on the floor of the House anyone who, as they think, encroaches upon their privileges. If the Irish members had allowed Mr. Stuart to go on, the time wasted in what was really a disgraceful brawl would probably have sufficed to dispose of the business which had given rise to it.

By a somewhat remarkable coincidence, "The Times" last Thursday contained a letter two columns in length by Mr. G. Shaw Lefevre on the subject of the Staines scheme and the London Water Supply, in answer to the letters of Sir Frederick Bramwell and Colonel Lockwood which appeared in the leading journal on the 16th inst. The publication of the letter was evidently arranged in view of the debate expected to take place on the Welsh Water Bill of the London County Council in the afternoon. But, as a financial contemporary rather wittily put it, ordinary members propose, but Irish members dispose; and, as already explained, the debate never came off. Mr. Shaw Lefevre says, in his opening sentence, that he does not think it necessary to deal at any length with the "some-"what belated and not very courteous replies" of his opponents. We are curious to know what his ideas of "length" may be, if one-third of a page of "The Times" is regarded as short. It is rather singular that his letter should be dated the 12th inst., and yet be a reply to statements which were not made public till the 16th—four days later. It is unnecessary here to deal with the various engineering and financial details brought forward by the writer in support of the Welsh scheme and against that which contemplates the construction of reservoirs in the valleys of the Thames and the Lea. The whole question was thoroughly investigated by the Royal Commission, with the assistance of Colonel Rathbone; and the public will, we imagine, accept their conclusions rather than those arrived at by Mr. Shaw Lefevre. It has often been said that figures can be made to prove anything; and he endeavours to show that the difference in the cost of the two schemes is much less than the £6,000,000 stated by the Commission. But, even at the cost of this sum, he thinks it would be worth while for London to secure the advantages of the Welsh scheme, and avoid what he calls the "evils and possible perils" of the other, seeing that the interest on the additional outlay would only entail a rate of a little over ¾d. in the pound on the districts served by the Water Companies. As to the future, he believes that it will be relatively less costly to increase the supply from Wales, when the aqueduct is finished, than from the

Thames and other sources. But it must be remembered that until that work is completed not a single drop of Welsh water could be conveyed to London; whereas, as Sir Frederick Bramwell very properly pointed out, the Staines scheme admits of reservoir after reservoir being added as and when the needs of the Metropolis require this to be done. Another member of the County Council—Mr. F. Verney—has rushed into print in support of the Welsh scheme on the ground of the softness and purity of the water it will furnish. We question whether the death-rate of London would be much lower with such a supply than it is now; soft water is deleterious in certain cases.

It is gratifying to find, from the last report presented to the Official Water Examiner by Sir William Crookes and Professor Dewar, that the exceptionally heavy rainfall of the past month—no less than 4·23 inches having been recorded at Oxford, as compared with an average for February of 1·76 inches—had not a very detrimental effect upon the London Water Supply. It is true that the organic carbon was higher, and the bacteriological purity of some of the filtered waters lower, than the average of the past few months. The water derived from the Thames was necessarily affected to the greatest extent; and therefore it is not surprising that the number of microbes was occasionally high. However, careful attention was paid to the filters; and things soon righted themselves. The statement that unfiltered Thames water contained (taking the mean of 24 samples) 8086 microbes per cubic centimetre, would be sufficient to evoke a great outcry about "dilute sewage," if it were not followed by a more consoling one that the mean of 270 samples from the clear-water wells of eight Thames-derived supplies showed only 66 microbes in the quantity named, or 34 less than Dr. Koch's standard. Moreover, there is the further assurance that the organisms contained in the exceptional samples were "harmless river microbes." So much for the Thames. As far as the New River and the Lea are concerned, notwithstanding the floods, the bacterial quality of the water from these sources was exceptionally good. The testimony of two such Chemists as Sir William Crookes and his colleague ought to satisfy the most sceptical, especially in view of the fact that London water is submitted to chemical analysis and physical examination by Dr. Thorpe, on behalf of the Local Government Board. But the County Council are not satisfied. They like to make their own examinations, at a cost to the ratepayers of £37 a week. Last Tuesday, the Water Committee were voted, in spite of protests, a sum of £400 to cover the cost of these analyses up to the end of the present month; and authority was given to the Chemist (Dr. Frank Clowes) to continue them for another six months. Dr. White very properly complained at this waste of public money; no less than £3000 having been spent by the Committee in the past three years.

While we receive fairly reassuring reports on the quality of London water, our neighbours across the Channel are not so favoured. According to the Paris Correspondent of the "Pall Mall Gazette," visitors to the Exhibition will do well to "beware of the water-bottle;" from which it may fairly be inferred that the supply—like a large number of the citizens rather more than a century ago—is "suspect." Of course, when the water of the Seine has to be turned on in the summer, nobody looks for absolute purity; but Parisians have always trusted the spring water. It seems now, however, that this is very far from being above suspicion. The Municipality have, we are told, been listening to some ugly stories in this connection; and all the greater importance attaches to them from the fact that typhoid fever has been more or less prevalent in the city throughout the winter. We pointed out last July that, after fresh sources of supply had been tapped at vast expense, the water was found to be polluted. This is now proved beyond question by the discovery therein of the typhoid bacillus; and the result is that the consumers suffer. The authorities are perplexed and disappointed at the result of their labours to procure a pure supply for the city; and all they can do is to confess that their water cannot be recommended for consumption unless it has been boiled. This confession, as our contemporary's correspondent says, is "all too eloquent as it stands" to need any comment. We may not, in regard to water supply, be living under the best possible conditions in London; but, at all events, we do not appear to be so badly off in this respect as the Parisians.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 821.)

THE week just concluded opened on the Stock Exchange brighter and stronger, and with every promise of a considerable revival in activity. But this was scarcely maintained all through; and from time to time a little check was encountered which warned operators not to be too free. Still, some departments sailed along gaily enough without being taken aback; Americans being conspicuous in the front. Prices there showed a nice advance; and nowhere was there any falling off in value to an extent that arrested attention. Consols and the War Loan were strong. The tendency in the Money Market was somewhat variable; but at the close it was decidedly firmer, and rates for discount stiffened. Business in the Gas Market was more animated than in the preceding week, though it never rose to anything more than a fair average. It was also nearly destitute of any feature of interest; and movements in value were extremely few in number and but slight in degree. And they were irregular, too; the ups and the downs being actuated by special circumstances affecting each. In Gaslight issues, the ordinary opened with the rising tendency it had displayed at the close of the previous week, and at once proceeded to improve upon it to the extent of one point. But there it stuck fast; and transactions every day were marked at the same level figures. The secured issues were moderately dealt in, at about middle prices, without giving any sign of a disposition to move either way. A single bargain in South Metropolitan was all the business recorded in that line; but it was at top price. Commercials were lightly dealt in at fair average figures. There was next to nothing effected in the Suburban and Provincial group; and the only variation in price was a drop in British. The Continental Companies again showed weakness; but there was not much business done in them. A fall of two points lowered Imperial. The undertakings in the remoter parts of the earth were all devoid of any feature of interest. Business in the Water Companies remained in the same extremely quiescent condition; and the tendency was all in the downward direction wherever a change took place. Kent was the chief sufferer, followed in a lesser degree by Lambeth and West Middlesex.

The daily operations were: Business in Gas was moderate on Monday; and very few issues were dealt in. Among them Gaslight ordinary advanced 1; but British receded ½. On Tuesday transactions were mostly confined to Gaslight ordinary, which held its position. Quotations did not move. Wednesday was almost a repetition of Tuesday's operations; and again quotations stood still. Thursday's dealings were very limited; and the only feature was a fall of 1 in Imperial Continental. Friday was about the quietest day of the week; and there was no change of any sort in Gas prices. In Water, Kent fell 4½, Lambeth debenture 3, and West Middlesex 2. On Saturday, prices in general were steady and unchanged, except for Imperial Continental, which fell 1 more.

ELECTRIC LIGHTING MEMORANDA.

Mr. J. Swinburne on Electric Tramways—The Danger of Electrolysis—The Ideal Road—The London County Council and Electric Tramways.

AN opportunity has not previously offered itself for noticing here an entertaining and suggestive article on "The Electric Tramway and its Future" contributed to the February number of "Feilden's Magazine" by Mr. James Swinburne. To style the gifted author the chartered humorist of the electrical engineering profession might be regarded as a derogatory expression; and we esteem Mr. Swinburne far too highly to wish to class him as a mere "funny man." But, like Sir Frederick Bramwell, Mr. Swinburne wears his gift of engineering insight and his acquired mechanical science-lore so lightly, that he can give an amusing turn to what in less expert hands would be the heaviest of technical subjects. Mr. Swinburne sets out the case for electric tramways very neatly. Electric working for tramways only really made a start when the overhead trolley-wire system came into use. This system has the obvious advantage of cheapness, combined with efficiency. It has the disadvantage of earth return with consequent electrolytic troubles; and it is unsightly. Compared with accumulator, steam, gas, and oil systems, it has also the drawback of demanding special permanent way, and a system of electrical distribution. As regards the first objection, its unsightliness, we agree with Mr. Swinburne that this is of little real weight where tramways do mostly run. There was a very reasonable and proper distaste felt in this country for the crude, slap-dash trolley-wire work tolerated in the United States towns whose streets are not streets but only thoroughfares. In due course, however, the English deftness in making mechanical things "eyeable," combined with better financial conditions, came to the rescue of the trolley-wire; and now only a puritan of æstheticism could charge the overhead electric equipment of a good tramway as worse to look at than the cars themselves.

Our own criticism of the trolley-wire system has had other and stronger bases. We suspected that electrolysis of gas and water mains and services in crowded thoroughfares invaded by

this method of tramway working would prove a more troublesome matter than its perfervid advocates would admit; and we also hold that the system is not applicable to the working of tramways just at those busy crossings and terminations in crowded localities where it is most desirable to get rid of the horses. In respect to the former objection, it is gratifying rather than satisfactory to find Mr. Swinburne in full agreement with us. We wish devoutly that we were mistaken; for the position as it exists is very serious. Mr. Swinburne curtly dismisses the usual airy plea that if there is good rail bonding, practically all the current will come back by the rails and return conductors. He characterizes the question as "really exceedingly difficult and obscure." Very little British experience has yet been had in regard to it; electric tramways being at present few and comparatively small. The system is rapidly growing, however; and "the corrosion of water and gas pipes is a matter that goes on day after day, and year after year, and the difficulty increases enormously with the area of distribution." After discussing various suggested expedients for obviating or minimizing the mischief, Mr. Swinburne emphatically declares once more that the chance of electrolysis is the real evil of the trolley and any other earth-return system.

This is a grave prospect. The pipes are in the roads already, and the trolley-wire comes to them. This is the only gleam of comfort in the situation; but preservation from injury is better than a remedy for damage done. Gas and water companies will have to look after their property. Wherever the trolley-wire goes, the old-time security of the gas and water distributing plant is destroyed. A very troublesome consideration in this connection is the truth of experience, that sharp electrolytic action occurs in isolated patches, which thus constitute "danger areas." Nobody can say beforehand whereabouts these areas are likely to be found. In the United States, a distinct line of electrical engineering practice has been opened out by one or two specialists for the detection and treatment of this phenomenon, which is so obstinate that, as Mr. Swinburne remarks, it has even been proposed to substitute stoneware for metal gas and water pipes. Things must be at a pretty pass when this counsel of despair is reached. Mr. Swinburne suggests that "scape-goats" of spelter or old rails might be used in such places to save the pipes. On the general question of electric traction, he is disposed to pin his faith, notwithstanding all experience, to accumulators. This method of carrying power he regards as the only electrical means of meeting the self-contained gas and steam power tram-cars on their own ground. The present accumulator is claimed to be very nearly, but not quite, good enough for practical use. The only question is how the margin separating it from complete success is to be passed. It is interesting to note that Mr. Swinburne's ideal solution of the problem of town traffic is automotor vehicles running on hard, smooth, clean roads, and therefore not restricted to a line of rails and an inflexible system. It is obvious that, the assumed necessity of considering the foothold of horses once deleted from the problem of town road-making, the construction of the road surface would be something very different from anything that has hitherto been adopted.

Some of the considerations here expressed reappeared in the proceedings of the House of Commons Committee on the Bill of the London County Council for authorizing the working of the Metropolitan tramways by electrical power. A capital sum of 3 millions sterling is involved in this project; and the question of electrolysis duly cropped up on the discussion of the preamble. It was complained that the Bill as it stood did not sufficiently protect the gas and water pipes; and it was urged that the users of electricity for tramway purposes ought to be made answerable for any damage done to this class of property, whether they used the best known methods or not. The point is of capital importance; but the Committee had no evidence brought before them showing that there has ever been any loss sustained in this country by electrolytic action on gas or water pipes. Consequently they elected to leave the matter among the others over which the Board of Trade will have the duty of watching as the enterprise goes on. The Committee were satisfied that the Board of Trade would take all necessary care of the threatened pipes. This is a high compliment to the Department; but it is not misplaced. For their part, the gas and water companies do not set up any claim to special protection in the sense of keeping electrical tramways at a distance for fear of what the consequences may be to themselves. The policy of the dog-in-the-manger has been municipalized of late years in respect of statutory electricity supply; but the gas and water companies do not follow it. They know that the major consideration of the public convenience must prevail over any fears they may reasonably entertain of increased risk in distribution work; and they are not disposed to cry out before they are hurt.

Chambers of Commerce and the Metric System.—At the recent annual meeting of the Association of Chambers of Commerce, a resolution was passed requesting the Association again to urge Her Majesty's Government (*a*) to introduce into, and endeavour to carry through, Parliament as speedily as possible a Bill providing that the use of the metric system of weights and measures shall be compulsory in this country within a period of not more than two years from the passing of the Bill; and (*b*) to adopt the system with as little delay as possible in all specifications for Government contracts.

THE COAL MARKET ABROAD.

The influence of the heavy and increasing demand for British coal abroad, in helping to bring about and maintain the present shortage of supplies in this country, has been already pointed out in the "Journal." It is obvious that, the export trade having such an influence on the home markets, an acquaintance with the principal factors in producing the enormous foreign demand for coal, and information bearing upon the question of whether these factors are likely to be permanent or are merely factitious and temporary, are essential to the formation of a judgment as to the probable future of the coal trade in the United Kingdom. Official information relating to the condition of the market in two countries to which considerable quantities of British coal are being shipped has been recently published, and may be considered briefly.

The growth of the exports of coal from this country to Russia has been very striking; the quantity shipped there in 1899 being 3,397,791 tons, as compared with 2,195,067 tons in 1898, and just over 2 millions in 1897. The increase last year in the exports to Russia was in fact heavier than to any other country—France coming next with an increase of 1,153,774 tons. The causes of this enormous increase in the requirements of Russia are discussed in a report received by the Foreign Office from Mr. H. Cooke, the British Commercial Agent in that country, and published almost *in extenso* in another column to-day, under the title of "The Coal Crisis in Russia." The report bears witness to the fact that that crisis is really acute, and has resulted in an "abnormal rise in prices, the exhaustion of available stocks, and the dearness of kindred mineral fuels;" and this state of affairs, be it observed, exists in Russia—as the shortage of coal subsists in this country—in spite of a very large increase (sevenfold in twenty years) in the output of native coal. It is attributed by Mr. Cooke, partly to "the undoubted rise and development of late years in the industrial activity of Russia, and the extension of railways and navigation" (in which latter category we presume he includes the growth of the Russian Navy); partly to the fact that the price of naphtha and kindred fuels had been previously artificially inflated by the action of syndicates and rings—leading to a greater demand for coal; partly to the fact that the vast coal resources of Russia have not been developed to an extent at all adequate to meet the home requirements. This is, in some measure, due to insufficient railway accommodation and generally defective transport arrangements.

As to the prospect of the native resources being sufficiently developed in the near future to meet the increased home demand, Mr. Cooke points out that the probability may even be the other way about, as the general industries of the country "are still in their youth, too; so that there seems no early prospect of the supply and demand coming more in reach of each other." It is obvious, therefore, that no relief can as yet be expected to the English coal market from any reduction in the demand from Russia. The opening of the Trans-Siberian Railway, and the development of the surrounding districts, will rather tend, we should say, to stimulate that demand.

It is interesting to note the steps taken by the Russian Government in their attempt to ward off the effects of the scarcity of coal—steps, some of which would, to put it mildly, be resented by coal-owners in England. The import duties have been either materially reduced or entirely suspended; all coal for use on the railways being admitted free until September. Then, at Warsaw, wholesale dealers have been summarily ordered, under heavy penalties, to keep prices below certain fixed limits; seventeen of the largest dealers having, further, been placed under police supervision! "By the end of December, dealers at Warsaw had raised prices to 225 roubles the load of 600 pouds [say 35s. per ton], while it cost them 100 roubles. The Government now forces them to sell at prices not higher than 115 roubles the load." The result has, we are told, not been entirely successful; the Government being obliged to send across the frontier for Silesian coal, which, however, it has failed to obtain. Hence the large orders recently placed in Wales.

The second country which has been abnormally short of coal, and in respect of which official information is to hand, is Austria. There the scarcity is due, as our readers are aware, to a strike of the miners; and from reports received by the Foreign Office from H.M. Commercial *Attaché* at Vienna, we now learn more particulars than have hitherto been available. The strike began on a small scale early in January in Moravia and Silesia; but it has since developed into the greatest strike that has ever taken place in Austria. Out of an approximate total of 110,000 coal miners, no less than 90,000 are said to be on strike. This number of men would, in the ordinary way, turn out something over 2¼ million tons a month; so that the effect upon the demand for coal from England through Germany (the latter country exporting her own coal and importing English coal) can easily be realized. Fortunately this increased demand will necessarily be limited to the duration of the strike, and the period immediately following its termination; although the colliery owners are reported to be firmly determined not to begin working again with full numbers, but to reduce production.

The men's demands were at first limited to an increase of wages; but they subsequently included the substitution of an eight-hours (bank to bank) shift, in place of the ten-hours system as at present in force; the fixing of a minimum wage; weekly

instead of monthly payments of wages; and free lights. Efforts at conciliation, by means of the Boards established by law in 1896, have proved unsuccessful; the main point of contention being the demand for an eight-hours shift. The employers made sundry concessions to the miners, including a 12 per cent. increase in wages; but against the eight-hours shift they took a determined stand, while the men have been equally bent upon obtaining this, their principal, demand.

The latest news, however, is that many of the men are returning to work, and that the complete collapse of the strike is within measurable distance; the men being unable to longer maintain the struggle. The leaders are reported to have informed the men that they could not advise the continuation of the strike, but must ask them to return to work unconditionally—all the funds having been exhausted. As the owners announce that, so soon as the men have resumed work, they will open negotiations as to the granting of higher wages, it is to be hoped that—in spite of the many incitements to violence made by the Czech Socialists, who are attempting to profit by the upset—this bitter and costly struggle will almost immediately cease, if it have not already done so. It is madness for either men or masters to miss the golden harvest at present to be reaped in the coal trade. They are both making hay while the sun shines in this country. It is, indeed, anticipated that the sliding-scale audit in Wales at the end of this month will show a larger advance than has been conceded for ten years. For the relief of the home market to be anticipated in, say, a couple of months' time by the resumption of work in Austria, the coal buyer will be duly grateful; but we fear it will be at least partially discounted by a steadily growing demand from Russia. A further move in the direction of an increased supply in Germany has been taken by the Rhine-Westphalian Syndicate, which has recently removed the restriction hitherto imposed upon the output of the collieries belonging to it, and has granted them permission to raise and sell all the coal they can. But the effect of this action will not be felt for some months; and although it is bound to come, the time of cheap coal is not yet.

MUNICIPAL CORRUPTION AND MUNICIPAL TRADING IN THE UNITED STATES.

THE frailties and ambitions of our own Municipal Authorities—especially in regard to the widely prevailing mania for embarking upon every form of industrial enterprise—have been, and undoubtedly will be, the frequent subject of comment in these columns. It may, therefore, not be without interest to consider the experience of our American cousins in this respect, and the tendencies observable in their municipal politics. The subject is especially within the province of a journal devoted to the interests of gas lighting and water supply undertakings, for the history of the relations between the gas and water companies of America and the governing bodies of their areas of supply would fill a goodly tome, and afford the choicest reading. An article published in the last December number of the "Contemporary Review," entitled "The Trend in American Cities" (by Mr. J. W. Martin), affords much illuminating information regarding the working of Municipal Government in the States at the present time, though the inferences drawn by the writer from the conditions and tendencies he depicts are decidedly paradoxical. That they would at first sight so appear to an Englishman, Mr. Martin is conscious; and he seeks accordingly to reconcile the inconsistent—with what success we will presently consider. The two most prominent features of the municipal life in the States are, says Mr. Martin, the continuance of corruption—though of a somewhat less flagrant character than formerly—and a growing tendency towards municipal monopolistic trading. "Effect and cause," would be the natural reflection of a student of the subject; but no, "evil and that which will effect its cure," says the reviewer. Before proceeding to discuss this apparently and, we think, demonstrably false conclusion, we will briefly notice the existing condition of American municipal affairs as depicted by Mr. Martin in his article.

That politics both municipal and general in the United States are blighted with the canker of corruption, to such an extent that it has been, and is, a matter of no little difficulty to persuade an honest man with a regard for his reputation to enter political life, is so notorious that we may state the fact without exposing ourselves to the accusation of slandering our American friends. We do so, moreover, without any intention of drawing comparisons with English institutions; we rather wish to, thereby, point a warning to the thick-and-thin advocates of "Municipalism" (blessed word!) in this country. The article before us details many instances of the prevailing corruption, and especially refers for proof thereof to the evidence given by the famous "Boss" Croker before the Committee that was appointed last year (by the Republican party) to investigate the government of Greater New York City by his—the Democratic—party. Mr. Croker not only did not deny that his political morality rose no higher than the code which has for its motto "To the victors the spoils," but even appeared to glory in the completeness with which he had carried this principle into action. All appointments were, under his *régime*, subject to the approval of the city leader. Judges had to pay heavy subsidies to the election funds, and to appoint referees and arbitrators agreeable to the leader; while employees, from the scavenger to the City Treasurer, were adherents of the reigning party. "Working for my own profit? Of course. Day and night, and every day." Such is the summary we are given of the cynical avowals of the Democratic "Boss."

It is not, however, in New York alone that the principles of Tammany are practised. In Philadelphia, we are told, "the City Hall is still incomplete, though a self-perpetuating Commission has spent upon it over £4,000,000 . . . In Chicago, during last year [1898] the regulation that street-paving for more than a small amount should be let by contract to the lowest bidder was evaded in favour of party friends by the arrangement that separate bills for less than the limiting sum should be presented for bits of the work; the same contractor sending in a sheaf of accounts for one length of street. Quantities of street-repairing were paid for and not executed." The little matter of the unfinished, though well financed, City Hall is, however, but an item in the count against Philadelphia, which, says Mr. Martin, "is shamefully pre-eminent for the flagrant rottenness of its government." Its record on the gas and water questions we may quote at length.

> For many years the incompetent Council refused to allow the gas-works to be kept in a proper state of repair. They overloaded the staff with crowds of political henchmen; hundreds of thousands of cubic feet were supplied without proper check; improvements in manufacture were refused; and accounts were kept in an imbecile fashion. It is freely asserted, and commonly believed, that this policy was deliberately pursued at the instigation of those interested in securing possession of the works. At last, in 1897, the Council consummated its folly and treason by leasing the works to a Corporation, after hundreds of thousands of dollars, it is widely believed, were distributed amongst the aldermen in bribes.

So much for gas. In regard to the water supply, the final stage was not reached.

> In the spring of 1899, an epidemic of typhoid fever—attributed by doctors to the impure, unfiltered water which is distributed through the city mains—caused over 400 deaths in Philadelphia in ten weeks. Public indignation was hot, because again and again the Council had been warned by the medical profession, and strongly urged to construct the necessary filters and reservoirs. But either through careless neglect or malevolent design, the reform of the system was delayed, and typhoid fever germs were called in as allies of the speculators who wanted the water, as well as gas. But this time the criminal conspiracy to prevent efficient administration, and so to force on the sale of the works, was too strongly suspected for success; and the demand of the citizens was for "the purification of our present supply by sand filtration under city ownership and control." That demand has prevailed; and the necessary funds have at last been voted by the Council.

The writer having, by repeated instances, shown the prevalence of corruption in many of the principal American Municipalities, proceeds to prove the growing tendency of the citizens to adopt municipal trading—especially the control of such undertakings as gas, water, and tramways. In so doing, however, he incidentally shows that, in those cities where the Reform party has got the better of the corrupters and corrupted, and the public services are administered successfully and honourably, the change is due, not to the entrusting of these services to the care of the Municipal Council, but by their administration at the hands of a clean-handed and upright citizen who has been allowed to take the executive power out of the hands of the Council. Thus we are told that the magic change has, in Boston, been due to the public spirit and energy of Mayor Quincy, and that he is able to achieve his reforms by practically superseding the municipal authorities altogether. "Gradually the two chambers of the City Legislature have been stripped of their powers . . . Contemporaneously the Mayor is increasing the number of honorary appointive commissions . . . through which he secures the sympathy and assistance of representative people of good standing and ability, and evades the obstacles which an inept Council always presents to American reformers."

The weakness of the position so created lies, it will be seen, in the fact that for the maintenance of efficient administration it is necessary that an incorruptible man shall occupy the post of supreme authority in the Municipality. If Mayor Quincy were succeeded by an incipient Croker, what would become of Boston? Its last state would be as bad as its first. It is evident, in fact, that what is needed for the salvation of the American cities from the clutch of the corrupter is not, as Mr. Martin suggests, the handing over of all the public services to the control of municipal authorities notoriously corrupt, but the election to the Councils of upright men. If there were no possibility of the private Corporations corrupting public authorities, the former would turn from the attempt to "do" the Municipality to the more reputable, if sometimes less remunerative, occupation of doing their duty. If the case is really so bad as Mr. Martin would have us believe, there would be little hope for consumers in America ever receiving honest treatment except at the hands of some accidental and irregular autocrat such as Mayor Quincy; for the only alternatives which offer themselves to the American citizen are said to be those of suffering greater or less scoundrelism. "The alternative is not between honesty with private enterprise and dishonesty with public ownership, but between periodical and gigantic frauds, along with the surrender of city property, and the retention of valuable rights at the risk of constant petty peculation. . . . It is cheaper for the city to lose small sums annually through the selection of workmen for political reasons, than to remain in the grasp of private Corporations who can levy exorbitant charges." And then we are told that the trend towards municipal trading—or, as it is called,

city ownership—"makes for righteousness!" We can only say that it is a very short way on a long road.

The lesson appears to us to be rather to keep Municipalities and trading concerns as far apart as possible. We are not, in this country without evidence of the evil results of their juxtaposition. We have had the American experience the other way round. In Philadelphia, the Municipality were suborned into depreciating the water supply in order that a private Corporation might acquire the monopoly at an unjustly low figure. In London, the County Council have attempted to hamper the Water Companies in their work of supply, in order to prejudice them in the eyes of the public, and keep down the purchase price. Let trading concerns stick to trading, and governing bodies to governing. It is not good for men to trade with public money. To a certain extent, it is inevitable; but in so far as it is not inevitable, it should be avoided.

THE INTERNATIONAL GAS CONGRESS IN PARIS.

THE rules applying to the attendance and discussions at the forthcoming congress of gas engineers in Paris have just been received from the Offices of the Société Technique du Gaz en France. The conference will open on the 2nd of September, and last for about five days. Those who wish to send papers on the subjects suggested for discussion are reminded that they should be forwarded before the 1st of June; and those who desire to take part in any of the discussions should send in their names by the 1st of July, when advance copies of the papers to be read will be forwarded to them. The programme of questions proposed to be discussed is as follows:—

1.—Inclined Retorts: Improvements and arrangements in different countries; their adoption in large gas-works. Compare the capital cost of inclined retorts with horizontals; economical result of this comparison on a basis of 1000 cubic metres made per day; opportunity of adopting them in medium-sized works; comparison of results on this system with stoking machinery, technically and financially.
2.—Mechanical stoking and general mechanical appliances for use in gas-works.
3.—Coke-conveying plant.
4.—Producers away from the furnaces, and feeding any one arch. Advantages of this arrangement.
5.—Effect of regenerative furnaces and of doing away with the hydraulic main seal on the production of ammonia.
6.—Measuring high temperatures.
7.—Thermal reactions in the distillation of coal.
8.—Conditions for establishing a modern gas-works.
9.—What are the best and most economical means of purifying gas? Choice of materials and their preparation.
10.—Uses of spent purifying material.
11.—The principal causes of the development of the production, sale, and uses of bye-products during the second half of the century.
12.—What progress has been made in the manufacture of yellow prussiate of potash in gas-works, and what are its advantages?
13.—Manufacture of cyanides in gas-works.
14.—The adoption in gas-works of plant for carburetting poor gas.
15.—Means of preventing obstructions due to naphthalene.
16.—In what way can the normal loss of gas in distribution be reduced.

There are also other questions referring to wet, dry, and prepayment meters; to the use of gas for heating and motive power; to the possibility of adopting an international standard for testing the illuminating value of gas; to general photometry; and, finally, to the best ways and means for interesting and educating stokers, foremen, and others in their work.

RECENT PUBLICATIONS.

The Consumer's Handbook of the Law Relating to Gas, Water, and Electric Lighting. By Lawrence Duckworth. (Effingham Wilson.)

The author of this handbook, who is a barrister of the Middle Temple, is known as the exponent in a concise form of the law on various subjects; and in the work under notice he has endeavoured to explain it as affecting consumers of gas, water, and electricity. Only 24 out of the 96 pages in the book are devoted to gas, and 10 to electric lighting; so that the bulk of the contents relates to water supply. The author deals first with the breaking up and reinstatement of streets, &c., for furnishing a supply of gas, and then sets forth the rights of the suppliers and the responsibilities of the consumers in connection therewith. He indicates the penalties incurred for non-fulfilment by gas companies of the duties imposed upon them by statute, and shows how, and by whom, these penalties may be enforced. As already mentioned, the subject of water supply is treated at greater length; the author's exposition of the law being accompanied by the authorized rates of payment for water supplied by the different Metropolitan Companies. For much valuable information in regard to these Companies Mr. Duckworth acknowledges his indebtedness to Mr. Alfred Lass's "Analysis." The law in regard to electric lighting being contained in only three Acts of Parliament, and being in some respects similar to that relating to gas and water supply, the author is able to present in a few pages those points which are of special interest to the consumer. In an introductory chapter, he deals with some general principles in connection with his subject, and he has compiled a useful index. Consumers of both gas and water are very prone to charge the suppliers of these commodities with either exceeding or neglecting their duties; but they are not so ready to acknowledge their own responsibilities as users. If this arises from their ignorance of the law under which the supply is furnished, this state of things should prevail no longer, in view of the existence of such handbooks as that prepared by Mr. Duckworth.

The Life and Letters of Sir Joseph Prestwich. By his Wife. (William Blackwood and Sons.)

The name of Prestwich will be familiar to all acquainted with the work of the Royal Commissions of the past half century, for Sir Joseph was a distinguished member of two famous Commissions dealing with questions of importance to our readers. He was chosen, for his intimate acquaintance with the geology of the Metropolis and Home Counties, to be the geological member of the Royal Commission on Water Supply appointed in 1864, and was a prominent member of the Royal Coal Commission of 1866-71. His principal work in connection with the Water Commission was the drawing up of a hydro-geological map of the Thames Basin, for the purpose of showing the extent of the permeable and impermeable strata, and the position of all the principal springs. To these were added contour lines to mark the height of the springs and of the rivers in the different parts of their course. This map was accompanied by a plate of sections showing the dimensions of the underground reservoirs furnishing the springs, which, with the direct flow of rainfall from off the impermeable strata, give the total quantities of water available for the supply of London and other towns in the Thames Basin. These drawings—through the parsimony of the Treasury it is said—have unfortunately never been published, but are believed to be still pigeon-holed at the Stationery Office. Prestwich was, in fact, the leading authority of his day on the subject of the bearing of geological structure on the question of water supply; and the list of papers, books, &c., of which he was the author, contains references to numerous publications dealing therewith, from a paper read before the Royal Institute of British Architects in 1850—on the geological conditions which determine the relative value of the water-bearing strata of the Tertiary and Cretaceous Series, and on the probability of finding in the lower members of the latter, beneath London, fresh and large sources of water supply—down to the issue in 1895 of a revised edition of his "Geological Inquiry Respecting the Water-Bearing Strata of the Country round London, with reference especially to the Water Supply of the Metropolis, and including some Remarks on Springs."

He also, as we have said, made excellent practical use of his knowledge of geology as a member of the Royal Commission on Coal; Sir Roderick Murchison, in one of the sub-reports declaring himself "bound specially to record his admiration" of the researches made by Prestwich, both in regard to the known and the concealed coal-fields. He (Prestwich) was a strong supporter of his friend Godwin-Austen's theory as to the existence of coal-basins under the secondary and tertiary formations of the South and South-east of England—a theory since demonstrated to be in accordance with facts. The address which, as President, Prestwich delivered to the Geological Society, in 1872, comprised a review of these two principal fields in which his geological knowledge found scope for practical application; the first portion being devoted to "Our Springs and Water Supply," the second to "Our Coals and Coal Supply."

This record of his life which we have under notice possesses interest mainly for those who were fortunate enough to be the friends of Prestwich, and for students of geology and its practical applications; but for the general reader it has much value as being, without set purpose, the teacher of the possibility and value of the utilization of leisure time. Those who are unacquainted with his life will, after reading of the eminence he achieved in the world of science, be astonished to learn that Prestwich was engaged all his life in business in the City; and that his immense store of geological knowledge, and his intimate and complete acquaintance with the geology, not only of the districts in the close vicinity of the Metropolis, but of all the South-east and, to a lesser degree, of the South-west of England, were acquired in his "spare time" out of business hours. His industry and enthusiasm were indeed prodigious; and the story of his life of incessant, but much-delighted-in, work should shame the apathetic and indolent into making some fuller use of the powers they possess, small though they may be. Of the 24 hours, one-third, in the case of many engaged in commercial life, falls within the category of leisure time. How many make a profitable—that is, intelligent—use of that leisure? The circulation enjoyed by the scrappy, mind-debilitating publications of to-day is an eloquent answer.

Withal, be it noted, Prestwich was not a prig by any manner of means. He "had a passion for waltzing," music was always a great pleasure to him, and, as Sir Archibald Geikie says, he

was possessed of child-like simplicity of heart, unaffected modesty, and genuine goodness. As to the book under review, it were ungrateful to criticize as a contribution to literature the devoted labours of Lady Prestwich. The work, as was perhaps to be expected, has for its chief fault a failure to judge between the essential and the unimportant; for its great virtue, the presentment in simple language of the story of a true man of science and a real English gentleman.

Bacteria; Especially as they are related to the Economy of Nature, to Industrial Processes, and to the Public Health. By George Newman, M.D., &c. (John Murray.)

The science of bacteriology has suffered considerably in its public repute, both from the over-optimism of those of its devotees who have predicted the immediate extinction of this or that disease and a great prolongation of human life as the outcome of its study, as well as from the alarmist declarations of others who have inspired the general public with a belief that the bacterium is necessarily a destructive organism. The latter class apparently delight in horrifying their fellows by lurid warnings of the bacterial dangers lurking in the commonplaces of every-day life; so that men feel that there is no safety for them outside a sterilized glass case, and become bacteria-haunted—until they remember that their forefathers contrived to live to a respectable age in spite of the billions of micro-organisms dogging their every step, and so come eventually to regard the bacteriologist as a harmless crank with a microbe in his bonnet. Dr. Newman, in the volume before us, has done much towards placing the science in its true light, and has succeeded in writing a very interesting—indeed, fascinating—and withal extremely practical, treatise on the relation of bacteriology to the economics of daily life, as well as giving a full account of the results of its study up to the present time.

The whole of the 350 pages comprised in Dr. Newman's book are full of interest, and well repay perusal. But we can only notice, and that inadequately, the chapter with which we are most directly concerned—that on "Bacteria in Water." The subject is dealt with very comprehensively, from a detailed account of the method pursued (with illustrations of the apparatus required) in the systematic investigation of the bacteriology of a water suspected of bacterial pollution, to the description of the structure and characteristics of the chief disease organisms found in water. In giving the necessary directions for the accurate conduct of an examination of water for micro-organisms, stress is rightly laid upon the need for scrupulous carefulness in regard to using only sterilized vessels for collecting samples, and also upon the necessity for avoiding any delay in the examining of samples, in order not to obtain results falsified by the fallacies arising from the rapid multiplication of germs. As an example of this multiplication, may be mentioned the case of a sample of well water which at the date of collection contained 7, but at the expiration of three days 495,000 micro-organisms per cubic centimetre.

Upon the question of the standard of bacterial purity by which a water is to be classified, Dr. Newman, "after some experience of water examination, would favour a standard of 'under 500' [bacteria per cubic centimetre] being a potable water, if the 500 were of a nature indicating neither sewage pollution nor disease." This does not appear to us to be a sufficiently high standard for drinking water. Koch's standard is 100 bacteria per cubic centimetre. Judged even by this much higher requirement of purity, the water of the London Companies is well within the limit. Numbers (unless obviously enormously high) are, however, as Dr. Newman points out, by no means the only necessary guide to a verdict upon a water. "The presence of rapidly liquefying bacteria *associated with sewage or surface pollution* would, even though present in fewer numbers than a standard, condemn a water." The point is also emphasized that a chemical and a bacteriological report assist each other. "The former is able to tell us the quantity of salts and condition of the organic matter present; the latter the number and quality of micro-organisms. Neither can take the place of the other; and, generally speaking, both are more or less useless until we can learn, by inspection and investigation of the source of the water, the origin of the organic matter or contamination. Hence a water report should contain, not only a record of physical characters, of chemical constituents, and of the presence or absence of micro-organisms, injurious and otherwise, but it should also contain information obtained by personal investigation of the source. Only thus can a reasonable opinion be expected. Moreover, it is generally only possible to form an accurate judgment of a water from watching its history—that is, not from one examination only, but from a series of observations. A water yielding a steady standard of bacterial contents is a much more satisfactory water, from every point of view, than one which is unstable—one month possessing 500 bacteria per cubic centimetre, and another month 5000."

The causes of the purification of polluted water by the action of natural forces are enumerated by Dr. Newman and briefly explained; oxidation, dilution, and sedimentation being named as the three principal agents. The results of Prausnitz's investigations of the water of the Iser before, directly after, and at distances beyond, the point at which it receives the drainage of Munich, and Professor Percy Frankland's notes upon the River Dee, afford striking examples of the extent to which polluted streams are purified by natural means. The methods of artificial purification of water are considered at some length; and the effect of filter-beds in arresting bacteria, both by chemical and mechanical action, is fully dealt with. The importance of the layer of scum and mud on the surface of the sand at the top of the filter-bed in the nitrification of unoxidized substances, emphasized by Dr. Newman, was originally pointed out by Koch, whose "Water Filtration and Cholera"—which owed much to the investigations of Professor Percy Frankland—was of great value in calling attention to the efficacy of careful sand filtration in preventing the spread of disease.

Upon the inefficiency, and positive harmfulness, of the great majority of filters used in domestic houses, the author rightly lays great stress. He gives, however, an unqualified recommendation to the Pasteur-Chamberland candle-filters. As to the supposed efficacy of charcoal as a filtering medium, we are reminded that, "as a matter of experment and practice, it has been found by Frankland, Woodhead, and others, that charcoal actually adds to the number of germs after it has been in use for some days."

With the sections relating to the diseases conveyed by water, the bacteriology of sewage and sewage-polluted waters, and the other chapters in this most readable book, it is impossible in this review to deal. We can unhesitatingly recommend it to the study of everyone, for all are concerned with the influence of bacteriology upon problems of health and sanitation; but especially is it to be commended to those who are responsible for the water supply of this country.

PERSONAL.

Mr. Frank Green, Assistant at the Hamilton Corporation Gas-Works, has been appointed Draughtsman and Assistant-Manager for the Ceará Gas Company, Brazil.

Mr. W. J. Dibdin, F.I.C., F.C.S., formerly Chemist and Superintending Gas Examiner to the London County Council, has been appointed Gas Examiner to the Gravesend Corporation.

The recommendation of the Gas Committee of the Greenock Corporation that Mr. John Chalmers should succeed Mr. S. Stewart as Manager of the gas-works, mentioned in the "Journal" a fortnight ago, has been confirmed.

Mr. Andrew Wilson, the Manager of the Perth Gas-Works, has sent in his resignation, and it has been accepted. Mr. Wilson was appointed, in succession to Mr. Thomas Whimster, in November, 1895; having been previously in Carlisle.

Last Friday, the employees of the Elland Gas-Works had a farewell supper, under the presidency of the Engineer (Mr. R. Porter), in honour of the success of Mr. Frank Higginson in obtaining the appointment of Manager and Secretary of the Broadstairs Gas Company, as announced in the "Journal" last week. An interesting feature of the proceedings was the presentation to Mr. Higginson of a handsome oak timepiece, bearing a suitable inscription.

The appointment of Recorder of London, vacant by the recent death of Sir Charles Hall, has been conferred upon Sir Forrest Fulton, the Common Serjeant. The new Recorder, it may be remembered, was the introducer of the Metropolitan Water Companies (Regulation of Powers) Bill, which was passed on Aug. 8, 1887. It is referred to generally as Forrest Fulton's Act; and under its provisions water may not be cut off where the rate therefor is payable by the owner of the property supplied.

We learn with regret that among the names of the wounded City Imperial Volunteers (Mounted Infantry) with Lord Roberts is that of Mr. C. F. Nixon, a member of the clerical staff of the Gaslight and Coke Company at their Fulham works. Mr. Nixon had the distinction of being chosen as one of the orderlies to General Macdonald, but was unfortunately severely wounded in the chest during the fighting at Paardeberg in which his General was also slightly injured. We hope to hear of Mr. Nixon's speedy recovery, and trust he will be able to return to his duties in London none the worse for the injuries he has received in the service of his country abroad.

In the "Journal" for the 31st of October last, we mentioned that the Sheffield City Council had recognized the eminent services rendered by Sir Frederick Thorpe Mappin, Bart., M.P., and Sir Henry Stephenson—the former the Chairman, and the latter a Director of the Sheffield United Gas Company—by conferring upon them the honorary freedom of the city. The certificates, enclosed in silver-gilt caskets of beautiful design, were presented at the Town Hall last Thursday afternoon, in the presence of a large and distinguished company. The above-named gentlemen, with the Duke of Norfolk, to whom a similar presentation was made, head the roll of freemen of the city.

Yesterday week, at the meeting of the Bingley District Council, the Chairman of the Gas Committee (Mr. Gatecliff) took advantage of the opportunity to pay a warm appreciation to the work of Mr. G. D. Malam, the Gas Engineer and Manager, who, he reminded the members, was attending the meeting for the last time as an official of the Council—his retirement taking effect at the end of the month. He said that the members knew that when Mr. Malam was appointed, over twenty-two years ago, the gas-works were in a bankrupt condition, and gas

was twice the price it was to-day. Not only since then had the price of gas been reduced by one-half, but the amount of capital had also been reduced by one-half. The Chairman (Mr. A. Hartley) also spoke in acknowledgment of the valuable services of Mr. Malam.

OBITUARY.

The death occurred in London last Thursday, at the age of 80, of MARIA, widow of the Rev. W. R. Bowditch, B.A., Vicar of Wakefield, whose name is closely associated with the early history of gas lighting.

The death is announced of Mr. EDWARD CLARK, who from 1873 to 1893 was a member of the Lancaster Corporation, and twice filled the office of Mayor—in 1880 and 1884. During his first year in that capacity he inaugurated the water-works extension under powers obtained from Parliament in 1876, by which the daily supply that the town was enabled to take from the fells was increased to two million gallons.

Ex-Provost BREINGAN, of Helensburgh, died there last Tuesday. He had been a member of the Burgh Commission for nearly fifty years. Among many other offices which he held was that of the chairmanship of the Helensburgh Gas Company, which he only relinquished on the transfer of the Company's undertaking to the Corporation. Mr. Breingan was the moving spirit in the introduction of a gravitation water supply into the burgh.

The Bunsen Memorial Lecture.—Sir Henry Roscoe, F.R.S., will deliver the Bunsen Memorial Lecture of the Chemical Society after the annual meeting on Thursday next, when the Longstaff Medal will be presented to Professor W. H. Perken, junr., F.R.S.

Explosions of Gases.—Mr. J. K. Wood, of Dundee, read a paper on the "Explosion of Gases" before the Physical Society of Dundee on Saturday, the 17th inst. The subject was dealt with in its historical, chemical, and practical aspects; and the communication was highly interesting.

The Association of Gas and Water Engineers of Austria-Hungary.—"Der Gastechniker," the official organ of this Association, announces that the annual general meeting this year will be held at Presburg, in Hungary, on the 24th of May and two following days. The President of the Association is Herr H. Nachtsheim.

Society of Engineers.—At the ordinary meeting of the Society next Monday, the paper to be read will be on "Disinfection of the Maidstone Water-Service Mains;" the authors being Dr. G. Sims Woodhead, M.A., and Mr. W. J. Ware. Dr. Woodhead, it may be remembered, took a prominent part in the investigation which resulted from the epidemic of typhoid fever at Maidstone in September, 1897.

The Coal Contracts of the London Gas Companies.—The "Iron and Coal Trades Review" learns, "on excellent authority," that "the Metropolitan Gas Companies are now negotiating their contracts for the supply of coal for the ensuing year, and are being asked as much as 16s. per ton for that description of fuel, against 8s. 6d. per ton quoted at this time last year, and 6s. 6d. per ton paid some years ago. The Gas Companies are naturally disposed to resist this great advance, and are proposing to make short contracts, in the hope and belief that the present prices cannot last much longer. The Companies are taking steps to advance the price of gas by 3d. per 1000, in order to meet this serious rise in the cost of coal. They cannot recoup themselves in any other way; for the most that they can hope to secure as additional price for their coke is 2s. 6d. to 3s. per ton of coal carbonized."

Carbonic Oxide Poisoning.—An apt illustration of the manner in which medical scares may be initiated is furnished by some recent researches in which that much-maligned component of carburetted water gas, carbonic oxide, is well to the fore. It appears that the medical men and scaremongers who sought out water gas as their victim some time ago, and actually secured a half-hearted condemnation of that useful auxiliary of coal gas at the hands of a Commission appointed by the Home Secretary, might have also found their *bête noire*, carbonic oxide, in the tobacco smoke which so many freely inhale for a not inconsiderable term of their working lives. The "Deutsche Aerzte Zeitung" points out that evidence on the proportion of carbonic oxide in tobacco smoke, and on its toxic action, has hitherto been strangely contradictory. Exhaustive researches now, however, have proved that carbonic oxide is constantly present in tobacco smoke, but that the proportion varies with the rate of combustion and the amount of air aspirated. It ranges from 0·6 to 7 per cent. Yet even this would scarcely have been expected from the common experiences of smokers. Whether or not the daily absorption of small quantities of carbonic oxide, continued year after year, has an injurious chemical action on the blood of smokers, is a question which remains to be further investigated. We may, however, certainly expect to see all those who are unwilling to run the risk of a supply of carburetted water gas to our dwellings at once discard their tobacco, lest they bear unwilling testimony to the harmlessness of frequent small doses of carbonic oxide.

TECHNICAL RECORD.

THE NEXT MEETING OF THE GAS INSTITUTE.

We have received from Mr. Walter T. Dunn, the Secretary of the Gas Institute, the preliminary circular he has sent to the members in regard to the next annual meeting, which will be held in London on the 12th and 13th of June, under the presidency of Mr. E. Herbert Stevenson, M.Inst.C.E. Of course, no indication can be given of the nature of the technical business, as this matter is now under the consideration of the Council; but it may be expected to be up to the average of that of recent years, though probably the papers may be fewer in number. The usual premiums, with the President's Medal, will be presented as awards for contributions to the proceedings at the last meeting; and similar premiums are offered in connection with the forthcoming one. Following out the precedent of 1889, arrangements are being made for an excursion to Paris, in order to afford members an opportunity of visiting the International Exhibition. It is proposed to leave London on the evening of the second day of the meeting, and return on the following Saturday; though the visit may be prolonged if desired. The Council, as our readers are aware, have received from the Société Technique du Gaz en France a cordial invitation to the members of the Institute to participate in the International Gas Congress which, as already announced, is to be held in Paris on the 3rd and 4th of September next; and it has been accepted. The French Society are desirous of having papers from this country presented at the conference; and the assistance of the Institute has been invited in the matter. The Council trust the announcement may have the effect of ensuring a satisfactory representation of Great Britain at this international gathering. The circular closes with an invitation to those who have not already joined the Institute to enter its ranks, and with an appeal for support to its Benevolent Fund.

ESTIMATION OF NAPHTHALENE IN COAL GAS.

Paper by Dr. Colman and Mr. J. F. Smith.

At the Meeting of the Nottingham Section of the Society of Chemical Industry, at Burton-on-Trent, on the 31st of January, a paper on the above subject, prepared by Dr. Harold G. Colman (Chemist at the Saltley Gas-Works, Birmingham) and Mr. J. F. Smith, was presented. We published in the succeeding issue of the "JOURNAL" a brief abstract of the paper, but are now able to give the full text, as it appears in the current issue of the Society's "Journal."

No accurate method has hitherto been published for the exact estimation of the quantity of naphthalene present in coal gas, although a knowledge of the amount is of the utmost importance, in view of the great trouble experienced in so many gas undertakings from the separation of the hydrocarbon in the solid form in the mains and services. This brings about local stoppages, sometimes amounting to hundreds a day in large towns.

The great difficulty which has been experienced in devising a method of quantitative determination is due to the fact that naphthalene is a somewhat inert substance, and most reagents capable of extracting it from the gas simultaneously remove other hydrocarbons which are present in much larger quantity than naphthalene; and no ready method of separating the latter from such mixtures is known. Mr. J. P. Leather, in a recent paper,* has proposed a method which consists in passing large volumes of gas (200 to 300 cubic feet) at a slow rate through pure benzene, and then carefully evaporating off the latter. The residual oil contains all the naphthalene, but is mixed with a much larger quantity of toluene, xylene, &c. Details of the method of isolating the naphthalene from the mixture are not given in the paper; but this is apparently carried out by fractional distillation, which can at best give very approximate results. The method, moreover, is very cumbersome, as it takes several days to complete a test, and large quantities of gas and benzene must be employed.

After many unsuccessful attempts, the authors have succeeded in obtaining a method which gives results of sufficient accuracy for technical purposes, and which can be carried out much more rapidly than that proposed by Mr. Leather. It depends on the well-known fact that naphthalene combines with picric acid to form a fairly stable crystalline compound—$C_{10}H_8$, $C_6H_3N_3O_7$—which is scarcely soluble in aqueous picric acid. When gas containing naphthalene vapour is passed through a solution of picric acid, the whole of the naphthalene is removed, and separates out in combination with picric acid, as a crystalline precipitate. It was at first hoped that it would be possible to estimate the naphthalene by passing the gas through a definite volume of picric acid solution of known strength; filtering off the precipitate, and determining the amount of picric acid in the filtrate by alkalimetry. From the difference between the quantity of picric acid thus found, and the amount originally taken, the quantity of naphthalene in the gas passed could be calculated. The results, however, came out much too low; the reason being that the precipitate formed does not consist of pure naphthalene picrate, but is a mixture of the latter with varying quantities

* See "JOURNAL," Vol. LXXIII., p. 1734.

of free naphthalene. This difficulty has been overcome by treating the mixed solution and precipitate in a manner similar to that adopted by Herr F. W. Küster in his method for the estimation of naphthalene when mixed with other solid hydrocarbons which do not form stable compounds with picric acid.

In carrying out the test, a solution of the acid is employed which is nearly saturated at the ordinary temperature (about 1-20th normal). The strength of the solution is accurately determined by titration with decinormal baryta water or decinormal caustic soda; using as an indicator lacmoid, the colour of which changes from brownish yellow to green as soon as an excess of alkali is present. In standardizing the alkali, lacmoid must also be used as the indicator.

For the absorption of the naphthalene, a series of four bottles is employed, the first of which has a capacity of about 300 c.c., and contains 100 c.c. of picric acid solution; the second and third are small bottles, each containing 50 c.c.; the fourth bottle is empty, and serves to retain any splashings of acid solution from the other bottles, the gas passing thence to the meter. The gas is bubbled through at the rate of 0·5 to 1 cubic foot per hour until from 10 to 15 feet have been passed. As a rule, the whole of the naphthalene is retained in the first bottle, the liquid in the other bottles remaining quite clear. It is, however, possible that in very warm weather, or if the test is carried out in a very warm room, this might no longer be the case; and it would then, perhaps, be advisable to add a fourth bottle of solution. After the gas has been shut off, the contents of the second and third bottles are transferred to the first; the solution being washed out from the former with as small a quantity of water as possible.

Küster's method of procedure is then closely followed. The bottle is closed with an india-rubber stopper, through which passes a glass tube, closed at the lower end, but having a small hole blown in the side about an inch from the bottom. The tube is placed so that this hole is just below the bottom of the stopper, and the bottle then evacuated as completely as possible with a water-jet pump. While the pump is still working, the tube is raised so that the small hole is well above the bottom of the stopper—the bottle being thus sealed. It is then placed in a water bath containing sufficient water to cover it, the water is heated to the boiling-point, and the heating continued until the liquid is quite clear. The bottle is then removed and allowed to cool, with occasional shaking to wash down any naphthalene which may sublime on to the upper portion of the bottle. After standing for some time, preferably over night, the naphthalene picrate separates out completely, and is then filtered off on the pump, and the precipitate washed with a small quantity of water. (If much water is used, too low results are obtained; as, although naphthalene picrate is scarcely soluble in picric acid solution, it dissolves appreciably in water—100 c.c. of the latter dissolving 0·1857 gramme at 14°.) The combined filtrate and washings are made up to 500 c.c., well mixed, and 100 c.c. titrated with decinormal caustic soda or baryta water. From these data the quantity of picric acid which has combined with the naphthalene can be readily calculated. Naphthalene picrate has the formula $C_{10}H_8$, $C_6H_3N_3O_7$—*i.e.*, 229 parts of picric acid are united with 128 parts of naphthalene; and therefore the quantity of picric acid thus found multiplied by $\frac{128}{229}$ gives the quantity (0·559) of naphthalene in the volume of gas passed. For technical purposes, it is most convenient to calculate the result to grains of naphthalene per 100 cubic feet of gas.

In order to test the accuracy of the method, air was passed through a weighed U-tube filled with naphthalene, and then through a solution of picric acid, which was subsequently treated in the manner described above. The amount of naphthalene found agreed closely with the actual quantity taken up by the air, which was determined by the loss of weight of the U-tube. The results are given in the following table :—

Weight of Naphthalene Taken.	Weight of Naphthalene Found.	Difference.
Gramme.	Gramme.	Gramme.
0·040*	0·038	— 0·002
0 029*	0·030	+ 0·001
0·086*	0·085	— 0·001
0 26·†	0·254	— 0·007
0·110†	0·106	— 0·004
0·129†	0·126	— 0·003
0·150†	0·136	— 0·014

* Decinormal baryta water used for titration.
† Decinormal caustic soda used for titration.

In the last test given, where the error is greatest, the naphthalene picrate was intentionally washed with more than 100 c.c. of water, which, as pointed out above, dissolves appreciable quantities of the compound, and causes a low result. In the remaining tests, the average result is 2·45 per cent. low. In five out of the six cases, the result is too low, and only too high in one case. The method described, therefore, is accurate to about 1 part in 30 parts.

To prove that the other hydrocarbons contained in coal gas are not absorbed by picric acid in a manner which affects the test, a sample of the hydrocarbons present in the gas along with naphthalene, and boiling at a lower temperature, was made by carefully fractionating the portion of coal tar boiling below 200° C. until it was completely free from naphthalene. Air was then passed over 4·86 grammes of this liquid heated to 50° C. until it had disappeared, and the resulting gas passed through picric acid solution. On working out the test, it was found that only 0·001 gramme of picric acid had been precipitated—a quantity which is within the limits of experimental error. Any higher boiling hydrocarbons in the gas which form stable picrates (such as methylnaphthalenes) would, however, be precipitated, and therefore recorded as naphthalene in the test.

The ordinary gas pressure is not sufficient to force the gas through the series of bottles used for the test; but where the full gasholder pressure can be utilized, this will generally be sufficient. If this is not available, the pressure may be increased by means of a water-jet pump; but this has the disadvantage that the gas is washed with a large volume of water, which might remove some of the naphthalene. The authors therefore prefer the following arrangement, which can also be employed for any tests where higher pressure is required, and also for making tests such as estimation of ammonia, &c., in the crude gas before the exhauster, where it is under less than atmospheric pressure. The method consists in enclosing the meter in a stout case of galvanized iron, the top of which can be closed air-tight by means of suitable clamps and packing, and having a piece of plate glass fixed in front, to allow of the meter index being read off. The inlet of the meter is connected by means of a union, as shown in fig. 1, to a tube passing outside the meter-case, which is connected by a flexible tube to the testing apparatus—the outlet of the meter remaining open.

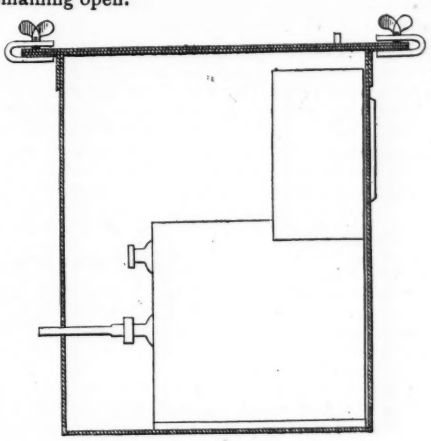


FIG. 1.

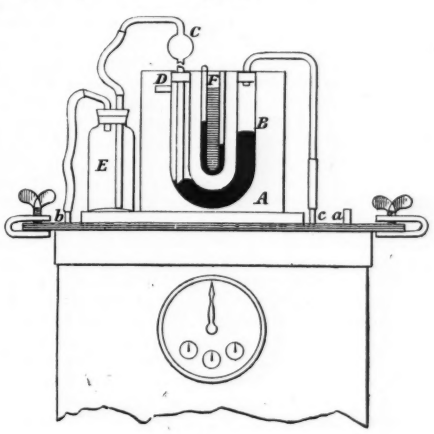


FIG. 2.

On the cover are three tubes, *a*, *b*, *c* (fig. 2), and a fourth, not shown in the drawing, which is attached to the mercury pressure-gauge F. The tube *a* is connected to a small steam or water-jet vacuum pump; and *b* and *c* to the pressure-regulator A. When the pump is started, and the air drawn from the meter-case, the mercury level rises in the right-hand limb of the U-tube B, and falls in the left-hand limb; this continuing until the level in the latter is below the bottom of the tube C. As soon as this occurs, air is drawn into the meter-case through the side tube D and the vertical tube C, so that the vacuum cannot then rise higher. Any desired amount of vacuum can be obtained by simply regulating the height of the tube C; and so long as the pump exhausts gas more quickly than it passes in through the meter, or through any leaks in the case, this vacuum is constantly maintained. The bottle E is interposed in order to catch any globules of mercury which may be carried over with the current of air.

With this apparatus, therefore, the pressure around the meter can readily be regulated to any desired amount below that of the atmosphere, and a vacuum of 2 inches of mercury (= 27 inches of water) is amply sufficient to draw the gas through any testing

apparatus, even if the gas itself is under the vacuum of 12 inches of water. The authors have employed it for several years with satisfactory results; no difficulty having been experienced in the working of it. In making the usual correction of the volume of gas registered by the meter for temperature and pressure, the amount of vacuum shown on the mercury pressure-gauge F must be deducted from the reading of the barometer, as this represents the difference between the atmospheric pressure and that within the meter-case.

As regards the results obtained with coal gas, very little information can at present be given. By the time the method was worked out, all trouble from naphthalene stoppages had disappeared, as is usually the case in Birmingham in the winter months; and the tests made up to the present time with the gas supplied to the town have shown only the presence of a quantity of naphthalene varying from 1·5 grains per 100 cubic feet to *nil*. It may also be mentioned that the picric acid solution can be used as a ready qualitative test for naphthalene; one milligramme giving a quite perceptible precipitate in the solution. If, therefore, after passing from 2 to 3 cubic feet of gas through the solution, no precipitate is formed, it may be safely concluded that the gas only contains, at most, traces of naphthalene.

MICHIGAN (U.S.A.) GAS ASSOCIATION.

The Seventh Annual Meeting of this Association was held at Detroit, on the 21st and 22nd ult., under the chairmanship of the President, Mr. L. E. Walker.

The President delivered an Inaugural Address, in the course of which, referring to the general state of prosperity, he spoke of the increasing use of gas for fuel, but expressed disappointment that, in respect to gas-engines, it was almost standing still. He directed attention to the difficulty experienced in disposing of tar at any reasonable price, particularly in small works, and invited information as to the most efficient methods of using it as a fuel. He deprecated "gas wars," as likely to injure the industry in general, by leading people to suppose that if gas was sold in one place at a price lower than actual cost, it could be sold under similar conditions everywhere.

Mr. Sedgwick Dean read a paper entitled "Differential *v.* Uniform Prices for Gas." The advantages claimed for differential prices were: An increased day consumption, meeting a popular demand, a material aid to introducing new business (as, if the stove was once adopted, it would not be long before lighting burners followed), and a tendency to reduce the idea of "monopoly" which was conveyed by the one-price system. With regard to the first point, he said it might have carried force 25 years ago; but at present many gas companies had reached a 50 per cent. day consumption, or over. The day consumption had been encouraged at the expense of the night consumption; and there was no economic benefit to be gained by further concessions. As to popular demand, no doubt a few might be captivated by special cheap lines; but he thought the majority would appreciate a straightforward, uniform method of business. Low prices might stimulate sales; but what was gained in one way might be lost in another. If gas was sold at 4s. 2d. per 1000 cubic feet for fuel purposes, and 5s. 10d. for lighting, who could say that the gain in fuel was not more than counterbalanced by the loss on light, and that better results would not follow a uniform 5s. rate? He could not understand the use of a customer who counted in the rental-book, but not in the profit side of the balance-sheet. While he could not perceive the justice of having two different prices according to the purpose for which gas is used, he admitted the principle of discount on a quantity. Uniform rates saved the consumer the cost of duplicate pipes, and the companies that of duplicating meters and accounts. The investment in meters, and the cost of reading the index, collection, and office work, were important items. The price of gas should be based on the cost of production; and the public had a right to demand uniform price for uniform service rendered. He therefore argued that differential prices for gas were outside fair business principles, and should be discontinued; and that a uniform price was economical, both to the consumers and to the gas company.

Mr. George Osius read a paper on "Ammonia: Its Saving and Concentration." His remarks were more especially intended for managers of small works who had not as yet given any attention to the saving and utilization of their ammoniacal liquor. Having insisted on the necessity for ample washing or scrubbing capacity, he proceeded to deal with the storage of tar and liquor. If only one tank was available, he advised partitioning off a portion for tar. A partition or wall should extend to within 1 foot of the top of the tank. A second partition should descend from the top of the tank to 6 inches below the other, and about 2 inches space be left between the two. This arrangement formed an effective separator. The condensed liquids being delivered into the tar compartment, all tar would be arrested, and clear liquor only would overflow into the second. The liquor should be pumped from this second compartment for the supply of the scrubber. The construction and method of working a concentrator were next described; and, by means of this apparatus, the crude liquor could be reduced to one-tenth its bulk. The concentrated liquor was to be stored in iron tanks only, and could be loaded for carriage into tank cars or iron drums.

The subject of "Meter Testing" formed the text of an important paper by Mr. Paul Doty, who, after enlarging on the importance of keeping up the efficiency of the meters, said that to secure this condition repairs at regular intervals—such as cleaning valves, oiling diaphragms, &c.—were indispensable. It was good practice to get every meter into the repairing and testing shops at least once in three years. He attached great importance to the "open" test (made with the outlet open full bore), as well as to the capacity test (made at the normal capacity of the meter), and the small-flame test. The results of these three tests, compared together, showed accurately the value of the meter in practice. He described in detail the precautions necessary to secure reliable tests, also the system adopted in his testing and repairing rooms, and exhibited a table showing the results of testing 5200 meters. Of these, 2770 were found to be slow; and 1850, or only one-third, were fit for use. He believed that the efficiency of the average meter was between 99 and 99·5 per cent.—in other words, 0·5 to 1 per cent. against the seller. Of 790 new meters tested, all came within the limits of 1 per cent. fast and 1·5 per cent. slow; 199 being correct, 222 fast, and 369 slow. The cost of his testing and repairing shop averaged 4s. per meter per annum, or not more than ½d. per 1000 cubic feet of gas sold; and he believed it was a very profitable investment. Apart from this, it was a great advantage to secure correct registration.

Mr. S. Milo Dole submitted a paper on "The Business End of a Small Gas-Works." While he did not belittle the importance of strict attention to costs and manufacturing statistics at the works, he insisted that, without a thorough grasp and complete understanding of the business relations between the gas company and the public, success would not be the ultimate result. There must not only be competent handling of the accounts, but judicious advertising, a first-class office, and an intelligent office staff. No fixed rules, applicable to all communities and classes alike, could be laid down; but each case must be dealt with according to its special requirements. The same might be said of advertising—both as to matter selected and the medium for circulation. In many instances, expert assistance was desirable; for it was not every man who had the ability to say a good deal in a few words, or to put those words in attractive form. He also thought there was too much tendency to concentrate the whole under one manager; and that in towns of 8000 or more population, it would be better for one man to take the technical, and another the business part of the works. Improved results would follow if the manager took up the branch in which he had been most successful, and engaged a competent assistant for the other; and he should be willing to recognize, and have others recognize, the real position held by his assistant.

Mr. H. H. Hyde, of Racine (Wis.) was elected President for the ensuing year; and it was decided that the next meeting should be held at Grand Rapids. A Committee was appointed to solicit subscriptions on behalf of a fund for establishing a scholarship in the Michigan University to be known as the Gas Engineering Scholarship; and a contribution of £20 from the Association was voted to the fund. It was also decided that the Committee should be permanent, and have charge of the scholarship.

Sulphate of Ammonia and Nitrate of Soda in France.—Statistics relating to the importation of sulphate of ammonia and nitrate of soda into France during the past three years show that there has been a decrease in the case of the former material and an increase in that of the latter. In 1897, there were 27,201 metric tons of sulphate sent into France, mainly from England; whereas in the two succeeding years the figures were 20,057 and 11,886 tons respectively. The imports last year, therefore, were 15,315 tons less than in 1897. Nitrate of soda, on the other hand, is growing in favour. Three years ago, the imports were 202,634 metric tons; while in 1898 they were 222,957 tons, and last year 261,388 tons.

Water-Meters for Checking Consumption.—Water-meters are now receiving careful attention in Cambridge (Mass.), where the problem of keeping the consumption down to a reasonable amount is fast becoming a serious one. For a few years domestic consumers have been allowed to choose between meter and "fixture" rates; and during 1899, 160 meters were put up in the business districts. The revenue received from the latter has been 28½ per cent. more than it was under the fixture rates, though the use of meters on domestic services has reduced the revenue from them by 11 per cent. The "Engineering Record" says the city must either adopt the meter system on a much larger scale, or spend between $500,000 and $600,000 for new works, which, with the waste checked, will not become necessary for ten to fifteen years. There is the further probability that the ultimate saving in interest and sinking fund charges, if useless waste is stopped, will be sufficient to pay for a new conduit. The Water Board recently made the following statement: "As all our water has to be pumped, and each gallon represents a certain amount of coal consumed, the water takers who are careful in the use of water, and guard against waste, are, under our present system, contributing to pay for the expense incurred by the wasteful and the careless, which is unjust. Under the meter system this injustice would be remedied."

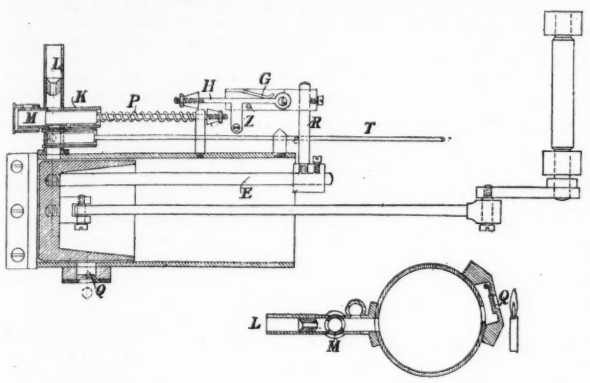
REGISTER OF PATENTS.

Gas-Engines.—Willcox, B.; a communication from A. Wolf and Co., of Frankfort-on-Maine. No. 7626; April 11, 1899.

This invention has for its object to provide a gas-engine without the necessity for the employment of either eccentric or toothed wheels; the valve motion being independent of the fly-wheel shaft. The engine operates in either direction, according as it is started.

Such a motor is illustrated in longitudinal and transverse section.

The cylinder is open at the forward end, and the piston in it is connected with the crank of the shaft, carrying the fly-wheel as usual. Another rod E projects from the piston, and carries by its cross-head the rod R, to which is connected a piece G, upon which is hinged a rod H carrying a cone or catch, and pressed by a spring against a stop.



When the piston moves from the position shown towards the other end of the cylinder, this cone or catch strikes against another cone or catch fixed to the outer end of the rod P of the piston-valve K, which is thereby displaced so as to allow the mixture of gas and air to pass from the conduits L and M to the cylinder behind the piston. As the piston further moves forward, the piece Z, fixed to the rod H, strikes against a stop on the cylinder, thereby lifting the cone or catch, and releasing the cone or catch on the rod P, which is then returned by the spring, and so causes the valve to close the gas and air ports immediately before the piston passes the opening Q in the cylinder. After the piston has passed the opening, the mixture is ignited (in any known manner), and drives the piston forward. When the piston has arrived at the end of its outer stroke, the rod R strikes against a projection on the rod T of the piston-valve, which is thereby operated to allow the products of combustion to escape during the return stroke of the piston. Shortly before the return stroke has been completed, the rod R strikes against another projection on the valve-rod, thereby re-closing the exhaust opening. A new cycle then commences; and so on, during the operation of the engine.

By small secondary air-admission valves, controlled by the piston-valve K, which open and close during the stroke of the piston-valve, more or less additional air can be admitted, and the charge in the working cylinder be thus modified.

Carburation of Gas.—Boult, A. J.; a communication from G. Peeters, of Brussels. No. 8545; April 24, 1899.

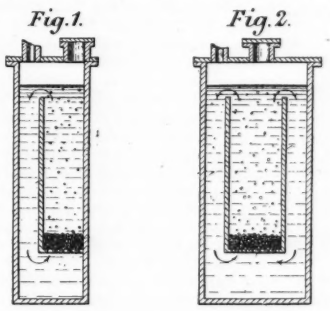
The patentee does not file with his specification a drawing showing the form of apparatus best suited to carry out the object of his invention, the claim for which is: "In a carburetting process of gases used for lighting, inserting a carburettor or carburettors in the gas-conduit—said carburettor consisting of a suitable receiver or recipient enclosing a filaceous, fibrous, spongy, or porous medium, passed through beforehand by a suitable gas until it is charged with the carburetting principles of the gas; then passing the feeding gas of the lighting apparatus through the said carburettor, the said gas keeping up the saturation of the medium on the one hand, and becoming carburetted on the other hand."

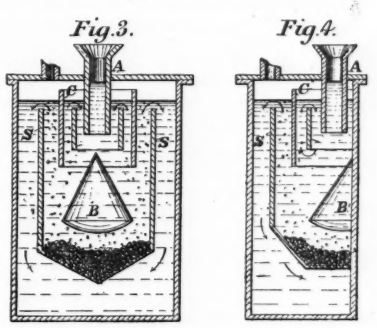
Acetylene Generators.—Thompson, W. P.; a communication from A. Wegmann-Hauser, of Zurich, Switzerland. No. 8648; April 25, 1899.

The illustration shows several forms in which this acetylene generator can be made. In all of them, it is divided into compartments which communicate with one another above and below the partitions. One compartment serves for receiving the carbide on a grating, and water flows into it upwards, together with the acetylene which is released at the surface, and then flows over the partition down into the second compartment. In this latter, it descends, then passes under the grating, and is again drawn above the grating by the upward suction produced by the rising of the acetylene. It flows through the latter, and the carbide lying thereon, into the first compartment; and so forth.

Owing to the specifically lighter water charged with gas, and which rises upwards, being separated by a partition from the specifically heavier descending water which is freed from gas, very energetic circulation of the water in the course indicated is said to be brought about. "The carbide is thereby constantly washed through, and thus the hydrate of lime which, on the evolution of gas, forms on the surface of the pieces of carbide, and by impeding the evolution of the gas causes heating, is constantly washed away, so that the pieces of carbide retain a crystalline surface. The evolution of gas takes place, therefore, very rapidly, and without any heating or polymerization; and acetylene of the highest purity and evenness of quality is produced."

Figs. 1 and 2 will be easily understood without further explanation. Fig. 3 shows a carbide feed-pipe A, provided with a water-seal, which is protected against the escape of gas by the way in which the water circulation is directed. A conical body B is arranged beneath the pipe, by means of which the water and acetylene rising from the grating are forced against the partition S, so that the gas cannot rise directly against the feed-pipe. In order that, even during a violent evolution of gas, no acetylene may penetrate into the feed-pipe A, a pipe C is provided projecting above the surface of the gas-evolving water. A secondary or subsidiary circulation is thus established in the space between the pipes, which circulation may be further assisted by another pipe on the outer

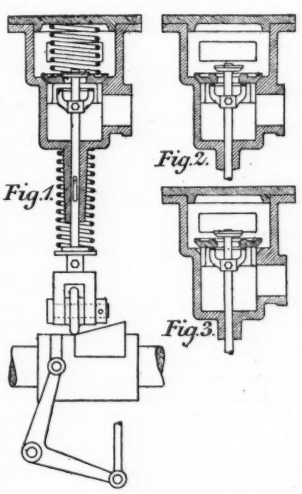




side of which the water rises upwards, while the water releases on its surface the bubbles of gas passing through it under the pipe C, in order afterwards to descend, freed from the gas, on the inner side of the outer pipe; and so forth. A sufficiently gas-tight closing of the feed-pipe is thus produced; and carbide may be conveyed into the generator through this feed-pipe without allowing gas to escape from, or air to enter, the generator. The same object is attained if, as shown in fig. 4, the arrangement is not a central one.

Admission-Valves for Gas-Engines.—Abel, C. D.; a communication from the Gasmotoren Fabrik Deutz, of Koeln-Deutz, Germany No. 887; Jan. 15, 1900.

This invention relates to the regulating admission-valve apparatus for gas motor-engines, the power of which is regulated by increasing or decreasing the charge of combustible gas or the total charge of gas and air mixture—the engine being for this purpose provided with a regulating admission-valve, which is raised to a greater or less extent from its seat by the valve-gear acted upon by the governor, according as the load on the engine is greater or smaller. With this method of regulation, however, as the patentees point out, the disadvantage arises that the smaller the combustible charge to be admitted is, the greater is the inaccuracy of its regulation. On the one hand, with a large lift of the valve, any small inaccuracy that may occur in the extent of the lift (owing to play in the joints of the valve-gear, inaccuracy of the regulating cam, and other inaccuracies of adjustment by the governor) has no appreciable effect on the volume of the charge. On the other hand, the same amount of inaccuracy will, in the case of charges of small volume, produce a comparatively considerable variation as the ratio between the inaccuracies and the extent of valve-lift will be materially increased.



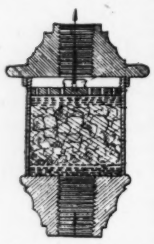
The present invention has for its object to do away, to a greater or less extent, with these disadvantages, by employing valve-apparatus consisting of a combination of two or more separate valves so arranged that, for small charges, only one of the valves is opened; so that any inaccuracy in the extent of the lift will not cause so much variation in the area of the charging orifice as would be the case if both the combined valves were raised.

Fig. 1 shows a vertical section of the valve-apparatus. It consists of two concentrically arranged valves, of which the central one is attached to the stem by which it is directly lifted by means of the valve-gear, and which carries a bracket so arranged that, after the central valve has been raised to a certain height, the bracket comes in contact with, and raises, the first-named annular valve. The valve-stem is connected either directly (as shown) or indirectly to a roller, which bears upon a moveable sleeve actuated by the governor-lever, and which carries an inclined cam operating in the now well-known manner. Fig. 2 shows the apparatus

after the opening of the central valve; the outer valve being still closed. Fig. 3 illustrates both the central and outer valves raised by the further motion of the stem.

Economizers for Gas-Burners.—Knaeps, C., of Brussels. No. 24,598; Dec. 11, 1899.

The patentee claims to have invented an "economical or saving economizer for gas-burners," shown as consisting of a body or casing of cylindrical or other suitable shape, formed in one piece with a suitable junction or union serving to fix the economizer upon the gas-supply pipe to the burner. The cylindrical body or casing contains a number of washers of perforated metal, or of wire gauze, &c., upon which is placed some filtering material, surmounted by washers similar to those first mentioned, held in position by a perforated screw-threaded plate or diaphragm screwed into the upper internally screw-threaded part of the cylindrical body or casing. The economizer is closed by a removable cap or cover, forming a junction or union adapted to receive the burner—the whole being "for the purpose of ensuring uniformity in gas pressure, and to enable a large ecomony or saving in the consumption to be effected."



APPLICATIONS FOR LETTERS PATENT.

4641.—Richards, W. F., "Production of gas for regenerative gas-furnaces." March 12.

4713.—Parnall, W. H., and Ruth, L. J., "Acetylene-gas apparatus." March 13.

4736.—Arzt, A. H., "Gas for illuminating and heating purposes." March 13.

4739.—Leckband, T. H. J., "Gas-meters." March 13.

4759.—M'Allister, E. A., and Gilroy, J. W., "Improved carburettor." March 13.

4775.—Green, W. O., "Prepayment gas-meters." March 13.

4786.—Morelle, C. T., "Generating acetylene gas." March 13.

4791.—Duncan, J. H. H., and Barnett, H. T., "Incandescent gas lighting apparatus." March 13.

4956.—Micoletzky, C., and Spitzer, J., "Gas-furnaces." March 15.

5028.—Hardie, R., "Pressure reducing valves." March 16.

5033.—Van Vriesland, A. I., "Compressing gas." March 16.

5089.—Dougill, A., "Gas and like engines." March 17.

Increases in Price.—The Walton-on-Thames and Weybridge Gas Company announce an increase of 9d. per 1000 cubic feet in the price of gas from the 25th inst. Owing to the Gas Committee of the Stoke-upon-Trent Town Council having to pay £3250 more for their coal than they paid under the last contract, they have been compelled to raise the price of gas from 2s. 9d. and 3s. to 3s. 6d. per 1000 cubic feet.

The Suggested Transfer of the Leamington Gas-Works to the Corporation.—At the seventieth ordinary general meeting of the Leamington Priors Gas Company last Tuesday (when a dividend of 10 per cent. on the "A" shares and 7 per cent. on the "B" shares was agreed to), the Directors reported the receipt of a notice from the Corporation requiring the Company to sell their undertaking, property, rights, powers, and privileges in accordance with, and subject to the provisions of, the Leamington Corporation Act, 1896. Mr. George Livesey had, they said, been retained on behalf of the Company; and negotiations for the transfer were now in progress. A special meeting of the proprietors would, however, have to be held shortly to consider the matter.

High Wycombe Gas Company.—At the recent half-yearly meeting of this Company, the Directors reported that the profits realized in the six months ending Dec. 31 justified them in recommending a dividend for this period of 6 per cent. on the ordinary shares, and of 4½ per cent. on the additional shares, free of income-tax. They stated that the half year had been one of exceptional activity. The Company had introduced means to stimulate the undertaking and to keep abreast of the times; the innovations being inspection of the customers' fittings, the laying on of supplies and the fixing of gas-fittings free of charge for manufacturing purposes; also the supply and fixing of gas-engines on the hire-purchase system. The Company boasted of being the pioneers of such a scheme throughout the world; and the Directors looked forward with much confidence to increased revenue, as already ten gas-engines had been sold—thus showing how the manufacturing public appreciated this most economical motive power. The increased business had resulted in additional consumption to the extent of nearly 20 per cent. There were no signs of abatement in the demand for automatic meters and heating and cooking stoves. The total number of slot meters out was 694; of cookers and grillers, 648; and of gas-fires, 58. These numbers were exclusive of the appliances bought by consumers without the intervention of the Company. During the past half year, the works had been improved by additional manufacturing plant to the extent of 25 per cent.; while the distributing system had also been considerably extended and augmented. The accounts accompanying the report showed that the profit had been £1510. In moving the adoption of the report, the Chairman (Mr. G. Wheeler) gave some particulars, compiled by the Manager, as to the progress of the Company. They showed that in 1897 the capital expended was £4203, or at the rate of £1 1s. per ton of coal carbonized; in 1898, £3818, or 19s. 1d. per ton; in 1899, £4661, or 18s. 7¾d. per ton. The Company had about nine miles of mains, yielding a revenue of £900 per mile per annum (which was exceptionally good for a town like High Wycombe); and 150 customers per mile. The maximum consumption of gas at Christmas, 1899, was 294,000 cubic feet per 24 hours, or 17 per cent. increase on the previous year, and 20 per cent. more than two years ago. About 1500 lights were put in last season for manufacturing purposes, exclusive of those for domestic lighting and the slot system. The report was adopted; and a vote of thanks was accorded to the Manager and Secretary for his services. In acknowledging the compliment, Mr. Wicks said he thought the increase of 50 per cent. in the profits for the past two years was marvellous, considering that the Company had lost a big customer in the public lighting. With regard to consumption, they were paid for 93 per cent. of the gas made, which was a high average.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

The Proposed Visit of the Gas Institute to Paris.

Sir,—Living as I do among foreigners all more or less antagonistic to England, reading as I do foreign daily papers full of invective against our country, seeing as I do shop windows decked with heartless caricatures of our beloved Queen, I thoroughly appreciate the patriotic feelings of Mr. S. Y. Shoubridge, but still feel that his protest against the visit of the members of the Gas Institute to the Paris Congress of the Société Technique de l'Industrie du Gaz en France is ill-timed and ill-judged. It is a communication which will sorely wound the feelings of M. Vautier and his colleagues.

I can assure Mr. Shoubridge that the ill-feeling existing against our nation in France is superficial to a degree, and is the outcome of the scurrilous Boulevard press. Thoughtful Frenchmen view with disgust these ribald effusions, and resent with force the attacks on Her Majesty; and I can safely say that the welcome extended to their English colleagues will outshine the welcome extended to the members of any other National Associations.

The Exhibition itself is intended to be a Palace of Peace and Goodwill; and it would be a churlish act on our part to refuse the hand of friendship, and thrust away the olive-branch extended to us.

Let us not do our French scientific brethren the palpable injustice of confounding them with the leaders of an irresponsible Press. Rather let us meet them cordially; showing them that we appreciate their hospitality. Let us prove to them that we are units of a great nation, above petty personalities; and let us by our visit endeavour to contribute towards the establishment of a friendship which is necessary for the mutual welfare of both England and France.

F. D. Marshall, President,
Institution of Gas Engineers.

Copenhagen, March 22, 1900.

Sir,—I hope your esteemed correspondent, Mr. Shoubridge, may be induced to modify his advice to the Associations of Gas Engineers, and that, on reflection, members will give pause before adopting the view that, because we must despise and deplore the scurrility of a few paltry newspaper writers and illustrators, we should practically resent and avenge them by shunning the Exhibition and avoiding the friendly overtures of our French *collaborateurs*, and generally the French people.

"Two wrongs do not make one right;" and, in my opinion, we should as a profession (and indeed individually) make a great mistake if we endeavoured to fix upon the nation responsibility for a few extremists. There are a number, like myself, who have been in touch with French engineers throughout the past months, and have been in French towns, and can assure Mr. Shoubridge and other doubting friends that the feeling of the mass of the people is in no sense such as these few papers might lead one to think.

On the other hand, much kind feeling and courtesy have been my own experience; and even apology and kindly remonstrance were made on my purchasing last December a number of "*Le Rire*" and other papers which I got to see what it was that was objected to. I can assure Mr. Shoubridge that the articles, and their foul illustrations, were entirely beneath contempt, and such as no respectable Frenchman would allow in his family.

We must try to draw nearer to, rather than shun, our neighbours, and show them that we can afford to laugh at these outbreaks of the few, just as we laugh at some of our own Members of Parliament who have cranks, and as the great mass of the Irish people have to laugh and ignore the excesses in the *mis*representations of their sentiments by some of those who profess to represent their constituencies.

We must not be two thin-skinned, and we must make for peace and conciliation—always, of course, preserving our self-respect.

H. E. Jones.

Stepney, March 24, 1900.

Sir,—As one who has just returned from a visit to Paris, where he received the greatest kindness from professional brethren, permit me to express regret that an English Gas Engineer should have written so bluntly, and I may say harshly, as Mr. Shoubridge has done in last week's "Journal" concerning the proposed Paris Exhibition trip of the Gas Institute.

I fear that his hasty words will give unmerited pain to a number of good French friends of all of us, who are as guiltless as he is of complicity in, or approval of, the scurrilities of a licentious Press. It should be remembered that this malignant sore of the French body politic hurts the French more than it does any other nation; and for one insult levelled at England, there are daily scores and hundreds hurled at all that good French citizens hold sacred and worshipful. Mr. Shoubridge speaks for himself alone; and his protest would have been all the more dignified and effective if he had made it quietly, by staying away from the proposed excursion.

If it were not so strictly individual, it would put in an awkward position those who, while feeling on questions of national politics as keenly as he does, yet think fit to exercise their own judgment of what is correct behaviour in all the circumstances, and will go to Paris, or stay at home, as they think right. Besides, the engagement, such as it is, is of longer standing than the present deplorable trouble; and it was made as part of a mutual feeling of fellowship which it is to be hoped will last when all these passing clouds of misrepresentation and false patriotism are past and forgotten.

An English Gas Engineer.

March 22, 1900.

Sir,—In your last issue there appeared a letter from Mr. S. Y. Shoubridge, regretting the acceptance by the Council of the Gas Institute of the invitation of the Société Technique du Gaz to attend the forthcoming International Gas Congress at Paris. He expressed the hope that no member of the Gas Institute will present himself; as he thinks that, by staying away, "a dignified and effective protest" would be made against

certain recent attacks that have been made on our Queen and country, by a portion of the French Press.

This letter must have been read with surprise and regret by many—with surprise, that anyone of experience and ability, and holding a prominent position, should so far lose his sense of proportion, and of the fitness of things, as to confuse the petty vulgarisms of a small section of the lower French Press with the polite discussions of gentlemen, of all countries and of all shades of opinion, interested in the progress of the science of gas lighting; with regret, inasmuch as it tends to foster the less worthy passions, and to lead to undesirable recriminations, besides showing questionable taste in reply to so cordial an invitation, given with such good intent.

In this connection may be quoted a recent declaration by Lord Russell of Killowen, who said "that any public man in either of the two countries who uses expressions calculated to create or excite feelings of animosity between the two peoples is acting contrary to the interests of the two countries." Does Mr. Shoubridge consider that the French people, as a whole, would be justified in considering themselves insulted by our Queen, Government, and nation, because of vulgar caricatures, however outrageous, which might appear in some of our cheap comic papers? Even our more important newspapers only represent a very small section of opinion; and, therefore, is not the best method of procedure, in cases of indecent abuse, one of complete disregard? A silent reply is often the most crushing and effective. It is a false patriotism, which is not to be confounded with "singing 'God Save the Queen' with great fervour on all suitable occasions," that inspires the noticing and prosecuting of these imbecile attacks on a universally respected Sovereign and nation. "Le Temps" may well ask, "Do not people in London as well as in Paris know the value of the jokes in the illustrated papers? One blushes to insist on these truths. We are glad that they are evident to Englishmen of weight and distinction, as they are in France to all our fellow-citizens who reflect a little."

It is, then, Englishmen of weight who may be expected to put to shame all these paltry boycotts, and to offer a dignified protest against what is ignoble, by a hearty acceptance of, and personal co-operation in, the invitation of the Société Technique du Gaz to the International Gas Congress of 1900.

AN ENGLISH MEMBER OF THE SOCIÉTÉ TECHNIQUE DU GAZ.

March 21, 1900.

SIR,—It is to be regretted that Mr. Shoubridge should, through your columns, sound a discordant note as to the proposed excursion to Paris by the Gas Institute after the London meeting in June next. Is it wise to question the decision of the Council not to alter its pre-arranged excursion to Paris simply because of the tone of the French gutter-press? Even if there had been no disclaimers on the part of representative Frenchmen as to the value which should be set upon the insults of "a *section* of the French press," why should the Gas Institute add fuel to the flame by slighting a nation for the offence of scribes who pander to the passions of the mob?

The invitation to the Gas Congress in September stands quite apart, and should not be confused with the June excursion. The mere statement quoted by Mr. Shoubridge, that "The Council of the Institute have received from the Société Technique de l'Industrie du Gaz en France, and have accepted, a cordial invitation to the Institute to participate in the International Gas Congress to be held in Paris next September," is sufficient evidence of good feeling on the part of the gas industry of France, as distinguished from the French press; and the Gas Institute has shown commendable wisdom in reciprocating the kindly feeling displayed in the invitation.

Is it not preferable to reduce the strain, and allay groundless irritation, on both sides by accepting the stretched-out hand rather than by offering the closed fist, as has been suggested in Mr. Shoubridge's unfortunate letter?

After such a manifesto from one who holds a high and honourable record in connection with the Gas Institute and its work, it is to be feared that, without some expression of approval of the Council's action, they may be greatly hampered in their efforts to foster those cordial relations between members of the gas industry in both countries which, on every ground, ought to be maintained.

SCOTUS.

March 23, 1900.

SIR,—I wish to express my hearty sympathy with the remarks of Mr. S. Y. Shoubridge in the current issue of the "JOURNAL." I can quite see that it may have been difficult for the Council, as representing a purely technical body, to refuse the invitation of the French Society; but I trust the members individually will not be slow in showing, by their replies to Mr. Dunn's circular, that they can sink their pleasures for their patriotism.

E. H. MILLARD.

Durham, March 21, 1900.

The Presence of Naphthalene in Coal Gas.

SIR,—May I be permitted to reply briefly to Mr. J. P. Leather's criticisms in the last number of the "JOURNAL," on the paper read by me before the Society of Chemical Industry on March 5.

Like Dr. Otto Hehner, Mr. Leather totally misunderstands the object of the experiments being conducted with air and hydrogen, as well as with coal gas. That these gases ultimately required identical weights of naphthalene to saturate them, I never doubted. The question—one of great importance where some hundreds of experiments were to be made—was whether equal volumes of the different gases completely saturated themselves with naphthalene in the same time, and at what speed the gas had to be passed over the naphthalene to ensure saturation. That the numbers I obtained are greater than those of Mr. W. Irwin is only to be expected; for, as I showed in my paper, the gas takes a very considerable time to completely saturate itself with the vapour of the naphthalene. Thus 1·27 cubic feet were not absolutely saturated with a length of passage of less than 135 hours. An increase in the volume of gas employed would necessitate a proportionate increase in the duration of the experiment; so that 100 cubic feet of gas would require a length of passage of 10,630 hours to ensure complete saturation! Did Mr. Irwin in his experiments employ a speed of passage for his gas in any way comparable to this; or did he determine a coefficient with which to multiply the value obtained at a much greater speed in the way I did. (See the forthcoming April number of the "Transactions of the Chemical Society.")

That the discrepancy between Mr. Irwin's results and my own can be explained, as Mr. Leather conjectures, by a failure on my part to observe that the losses of weight due to successive passages of equal volumes of gas are greater for the first than for the following experiments, is hardly to be entertained when account is taken of the fact that my experiments usually numbered between thirty and forty at each temperature. That I did not observe the peculiar phenomenon is quite true. This may be explained partly by the fact that I always did two or three rough preliminary experiments, but chiefly I think owing to my naphthalene being perfectly dry and perfectly pure. That perfectly pure dry naphthalene should behave as he says, is inconceivable.

Dr. Bueb's practical results, I did not quote in confirmation of accurate experimental results, but merely mentioned them as an interesting parallel. For real comparison, they are valueless; for there is no evidence that the gas was saturated before treatment with the petroleum oil and benzol, or that all the naphthalene was removed by the process.

Mr. Leather's arguments concerning the correctness of my deduction on the influence of the vapours of the solvents for the naphthalene on the amount of that body required to saturate a given volume of gas, are rather perplexing. He himself states that ordinary coal gas contains only sufficient solvent vapours of naphthalene to saturate the gas to the extent of 25 per cent. Yet he objects to experiments of mine—conducted at a higher temperature, merely to increase the weight of naphthalene carried over—in which the gas was saturated to the extent of 15 per cent. with a solvent vapour, as not being suitable for comparison. From a slight disagreement between the figures at the highest temperatures as read off from a diagram, Mr. Leather deduces an experimental error of 4 per cent. In this, he is quite wrong; the total possible errors of experiment being less than 1 per cent. He cannot, therefore, dismiss the results obtained at 113° Fahr. by actual experiment on the ground that the variations to be expected were within the limits of experimental error.

Finally, with regard to the assumption to which Mr. Leather objects—that the gas which formed deposits originally contained no naphthalene. He seems to think that it was owing to the non-formation of nitrophthalic acid that I made this deduction. The test for nitro-phthalic acid was only a confirmation, and was applied to the frozen-out product, not of 1·27 cubic feet, but of about 100 cubic feet. The real basis of my conclusion was this: If the coal gas contained naphthalene as it left the works, it necessarily contained some of it at every point of the distribution; for the whole could not be condensed out under the conditions to which it was subjected. Now, if the coal gas passed over the naphthalene contained even a trace of that solid, the results would always have differed with those obtained with air and hydrogen. But, at both low and high temperatures, with the same speed of passage, they were always the same. The great number of experiments made, and the length of time during which they were conducted, effectually precludes the idea that the gas as it left the pipe from which it was taken contained any naphthalene. Yet other pipes at equal distances from the works were being blocked up. On my assumption, this is easily explained. The conditions in the pipes where deposits took place were suitable for the formation of naphthalene, while those in any of the pipes through which my gas had passed were not. This seems to me to be a workable hypothesis. However, as I stated in my paper, it is only tentative, and wants experimental verification.

R. W. ALLEN.

Guy's Hospital, S.E., March 21, 1900.

SIR,—In replying to the discussion on his paper, on the presence of naphthalene in coal gas, Mr. R. W. Allen remarked that he did not think the method recently proposed by Mr. Smith and myself for the estimation of naphthalene in coal gas would give accurate results, inasmuch as benzene, which is always present in the gas, also combines with picric acid. It will, however, be seen from the full paper when it is published* that the presence of benzene and similar hydrocarbon vapours does not affect the accuracy of the test; for although most, if not all, of these do combine with picric acid under certain conditions, they are not obtained by the action of the vapours of the hydrocarbons on an *aqueous* solution of picric acid, whereas the naphthalene picrate is readily formed under these conditions. Thus it was found that about 5 grains of a mixture of the various hydrocarbon vapours occurring in coal gas, and boiling at a lower temperature than naphthalene, when volatilized in a current of air and passed through aqueous picric acid, had practically no effect whatever on the latter.

Any higher boiling hydrocarbons present in the gas, and which form stable compounds with picric acid—such as the methylnaphthalenes—would yield a precipitate with picric acid, and would, therefore, be recorded as naphthalene by the test. The greatest amount of such hydrocarbons in the gas is, however, probably extremely small, and would not materially affect the accuracy of the method.

HAROLD G. COLMAN.

Saltley Gas-Works, Birmingham, March 22, 1900.

SIR,—I am sorry I was unavoidably prevented from attending the meeting of the Society of Chemical Industry when Mr. Allen's paper on "Naphthalene in Coal Gas" was read and discussed; but I feel I should have shared in the feeling of surprise which Mr. Allen's theory evoked. Certainly, it upsets most of the preconceived ideas on the subject; but none the less does it require careful consideration.

So far as we are concerned at Hastings, the trouble with naphthalene is under control, owing to the means adopted for dealing with it, which are well known; so that it is now more of academic interest to us. But I am bound to say that diagrams made before our carburation process was in operation indicated that extremes in temperature, either rising or falling, always showed a similar curve as regards naphthalene complaints a few days afterwards. I also feel fully convinced that aqueous vapour (which is considerably increased when carburetted water gas is made) is an important factor in facilitating deposits. If Mr.

* The full text of the paper referred to by our correspondent (an abstract of it only having so far appeared in our columns) is given to-day, p. 798.—ED. J.G.L.

Allen's theory is tenable, it would account to some extent for the erraticity of naphthalene deposits as explained by different works under similar conditions—the one being troubled, and the other having none.

The question of condensation is an important point; but I may mention that I have always adopted here the plan of taking the gas and tar away together—drawing the heavy tar off at intervals; and there is no question of the absorption of naphthalene in this way. But this did not relieve us from trouble in the distribution of the gas. One point in connection with condensation is a difficult one—viz., that the proper apparatus remains constant but a short time owing to fluctuations or increasing make of gas, and the various inequalities of temperature which cannot be perfectly controlled under all conditions whatever system is adopted.

Mr. Leather's letter in your last issue is an important contribution on the question, in view of the theory advanced by Mr. Allen.

Hastings, March 22, 1900. CHAS. E. BOTLEY.

Gas Companies' Balance-Sheets.

SIR,—The "statements" as to the "Coal carbonized," "Gas made," and "Residual products—coke, &c.," which the balance-sheets of most gas companies now contain, are of much importance to the shareholders and others interested in their welfare, as they indicate in great measure the economic working of the plant. They show the growth in efficiency and output, and afford a means of comparing one company's working with another.

But since the introduction of carburetted water-gas plant, the utility of these statements has been somewhat impaired. As a rule, simply a line has been added in the balance-sheet, giving the quantity of "Oil used," &c.—forgetting that the "statements" need revision all round, in order to make clear the effect of the innovation. The statement of "Gas made" should be sub-divided into "Coal gas" and "Carburetted water gas." Under "Residual products," the "Coke used on works" should be divided into two columns—one headed "For coal gas," and the other "For carburetted water gas."

The reasons for this are the following: Before the advent of carburetted water gas, it could always be determined from the balance-sheet (at least, very approximately) what percentage of coke was used for heating the retort-settings. Now this is impossible, as the "Coke used" includes that consumed in the generators of the water-gas plant. By separating the quantities as I suggest, the fuel economy of working either the coal-gas plant or the carburetted water-gas plant would be evident.

Before water-gas plant came into use, the statements given under the headings referred to above enabled the shareholders to determine the quantity of gas made per ton of coal carbonized. Now this is impossible, as the gas made by both processes—viz., coal gas and carburetted water gas—is given in *total*, instead of being separated. Hence the economy of working the two different plants is not evident, as I think it should be, if the statements are to be of the service to the shareholders (when comparing the working results with those of other companies) that they used to be. If we have two separate and distinct processes of gas making, it would be desirable that the economic working of *each* should be evident—not the one mixed up with the other.

The suggested modifications to the statements in the balance-sheet involve very little alteration, and will occupy but very little space, although giving all the information required to bring them up to their former standard of utility.

71, *King William Street, E.C., March* 17, 1900. F. S. CRIPPS.

P.S.—Since writing the above letter, I find that Mr. George Livesey has already drawn attention to the matter (see "JOURNAL" for Feb. 20 last). I have also seen the accounts of the Crystal Palace District Gas Company to December last, in which I find the idea put into practice and carried out even more completely than I suggest.—F. S. C.

Raising the Price of Gas.

SIR,—Looking at the serious state of the coal market genera'ly, would it not be very helpful to Directors and Managers if through the "JOURNAL" you could elicit an expression of opinion from all the leading Engineers and Managers as to the course which should be adopted in reference to raising the price of gas? The replies must be very short—*multum in parvo;* and the more the better. Such a course would be a guide and satisfy Gas Managers and the public generally, if a united expression could be thus obtained.

Aylesbury, March 24, 1900. GEORGE LANE.

New Joint Stock Companies.—The Elche Water-Works Company, Limited, has been registered with a capital of £7000, in £1 shares, to acquire the business of the Alicante Water-Works Company, Limited, and to supply water to the town of Elche, in Spain. The gas-meter manufacturing business founded by the late Mr. George Newton at Oldham in 1862 has been converted into a private limited liability company, under the title of "George Newton, Limited," with a capital of £15,000, in £1 shares. Mr. Robert Newton, the founder's son, who has carried on the undertaking since 1876, will be the Managing-Director; and he will be assisted by his sons.

The Latest Russian Water Monopoly.—The town of Kovno is situated on the borders of the River Niemen, on the Russo-German frontier. It has a population of 72,000, and numerous factories make it a busy industrial centre. The concession granted to the Company supplying the place with water (constituted under the title of the Kovno Water-Works Company, Limited) gives them the monopoly for a period of 70 years. The Company has a capital of £100,000, in 100,000 shares of £1 each; but, in addition, there has been an issue of 500,000 bonds of £10, bearing 4½ per cent. interest. This monopoly is of considerable value, and therefore the Russian Government have decided not to grant any such concession in future. Each town will, it seems, have to construct its own works and supply water for the inhabitants. In the case of Kovno, it is reckoned that, with a consumption of 4¾ gallons per family per day, the annual supply will be about 172¼ million gallons.

PARLIAMENTARY INTELLIGENCE.

Gleanings from the Committee Rooms.

The progress of Gas Bills through Parliament is proceeding merrily. A large proportion of them are going forward without opposition; and in the case of certain others which have been threatened with hostility, there are rumours afloat as to likely agreement with the opponents. In fact, compacts of various kinds between promoters on the one side and malcontents and property-coveting authorities on the other seem to be the order of the day. Last Tuesday we announced settlements for purchase in the Ossett and Glastonbury cases, although in the latter the Corporation during the past week had to encounter a little disaffection with the bargain on the part of their neighbours in the district of Street. Then, early in the week, the Bedford Gas Company's Bill was withdrawn from the Committee to which it had been referred; and information is to hand that negotiation has resulted in the opposition being satisfied. Other withdrawals from Committees have been the Bills of the Kingston-on-Thames Gas Company and the Newtown and Llanllwchaiarn District Council; and we hear that the adjustment of differences has been effected in both. We do not know yet the exact nature of the arrangements; but, in the latter case (which is a Purchase Bill), the point or points at issue were very small, and no question of principle was involved. Terms of purchase are being discussed in connection with at least one other Bill; and the West Hartlepool Corporation have, in the proceedings on the Company's Bill, announced their intention of applying for purchasing powers next session. In truth, the municipalization of gas undertakings is having quite a little spurt. The instances of Morecambe and Glastonbury show that, if the parties to an agreement for transfer wish to avert after-trouble, they must take the outlying authorities within the gas-supply area into their confidence before completing their contract. Local authorities may also mark the confirmation, in the Hartlepool proceedings, of the futility of applying to Parliament for the insertion of a purchase clause in a Gas Company's Bill unless they can show clear maladministration of the Company's affairs. Very strong evidence is required on this point, as well as testimony that it is desirable in the interests of the ratepayers that there should be a change of proprietorship. The submission of a Purchase Bill which can be fairly and squarely discussed on its merits is far preferable. Another point worth notice is that the conversion and consolidation of Gas Companies' capital continues to find favour, and has received endorsement in two instances in the course of the past week – viz., in the Hartlepool and Cleethorpes Bills.

The Committee work of the past week has been almost destitute of notable contest in regard to gas matters; but in the latter part of this week and the following, there may be compensating activity. The group of London Gas Bills, two of which contain proposals the like of which has not been before Parliament for many a long day, will come under the consideration of the Commons Committee now sitting in Room 13 (it is to be hoped the promoters of the Bills are not in any way superstitious). The Committee have been kept closely engaged since Tuesday last with the measure introduced by the Lea Conservancy. Judging by the number of Counsel in attendance and the witnesses examined, a large number of interests are concerned in the questions involved. When the Committee rose on Friday, the promoters' case was practically completed—Counsel merely reserving the right to call another witness yesterday morning. It is impossible to say at the time of writing how long the hearing of the opponents' cases will occupy; but some of them are simply requiring modification of, or additions to, clauses. But it is very doubtful whether the Bill will be disposed of before the close of Wednesday's sitting. However, directly the end is reached, the Committee will take up the consideration of the Gas Bills. If the order in which they are down for consideration is followed, that of the London County Council will be proceeded with; and it will be succeeded in turn by the Gaslight and Coke Company Bill, the South Metropolitan Bill, and the Wandsworth and Putney Company's Bill. Very complete preparations have been made for supporting and opposing these Bills; and neither promoters or opponents are likely to leave a stone unturned to carry or overthrow them. Several of the witnesses who will be called have been hovering about the scene of the coming action during the past few days.

The satisfaction of the requirements of the Bedford Corporation in connection with the Gas Company's Bill was not a serious matter. The Company have agreed not to manufacture or convert the "bye-products of tar" upon certain lands; they have acceded to the desire of the Corporation to have supervisory powers in relation to the laying of gas pipes and mains; and, within three months after the passing of the Act, they are to deposit with the Town Clerk a map showing the course and situation of the mains belonging to them within the borough, and at the end of every six months the map is to be corrected to date. In default, the Company are to be liable to a penalty of £5.

Many will rejoice with the Brighton and Hove Gas Company and their Engineer (Mr. Joseph Cash, M.Inst.C.E.) upon the success of the stand which they made in connection with the proposal of the Corporation of Brighton to carry a high-tension electric cable in a continuous proximate line with the high-pressure gas-main running from the Company's works. The happy result was secured, too, without the intervention of the Commons Committee whose wearisome and difficult duty it was to sit for several days in order to unravel, and pronounce judgment upon, the different issues involved in a large tramway and electricity scheme which the Brighton Corporation are seeking powers to carry out. In the general purposes of the Bill readers of the "JOURNAL" have little interest, but they have in the point in regard to which the Gas Company sought relief, in order to protect themselves, their property, and their consumers. But in obtaining all they desired without a contest before the Committee, the gas industry, and the electrical too for the matter of that, has lost what, we believe, would have been an interesting and helpful addition to our knowledge on the question of the electrolysis of gas and water pipes. However, the time may yet come when Brighton will contribute a chapter to the recorded information on the subject; and it will be for the Corporation to take care that the opportunity does not arise. There were several points in the Bill upon which the Gas Company prayed to be heard; but the most momentous was the one referred to. Shortly the facts were: The Corporation asked power to construct a generating

station at Southwick adjoining the works of the Gas Company, and to lay electric lines for the conveyance of high-tension current along a narrow roadway (termed the "towing-path") leading from the proposed generating station to the main road from Shoreham to Brighton. In the towing-path in question reposes the high-pressure mains which convey gas from the Company's works to the gasholder stations—at Hove two miles distant, and Blackrock six miles. Very naturally and properly the Company objected to such undesirable neighbours for their high-pressure mains as high-tension electric cables would have been, owing to the perpetual danger of fusion or electrolytic action. It is not difficult to picture what a stupendous calamity might arise under these particular circumstances, especially during the night hours. It would not merely be a question of the escape of the gas passing from the works at great pressure, but there would be the danger of a rapid exhaustion of the gas which had already passed to the holders. Then, in the event of a conflagration or explosion, it would be a miracle if the high-tension cables did not suffer destruction. Such a disaster would mean that the whole of Brighton would be temporarily deprived of its gas supply as well as the electric current on which the tramways and a large portion of the lighting would depend. But all chances of such an appalling catastrophe have now been averted. By the early part of last week, the Corporation saw that the Gas Company intended to resist their proposal, and defend themselves to the end; and then, and not till then, they adopted a reasonable course. They abandoned their original idea of carrying the cables along the towing-path, and decided on another route. They also conceded certain other clauses affording protection to the Company. It is to be deplored that the Corporation did not arrive at this reasonable frame of mind two or three weeks sooner, as then much labour, expense, and anxiety would have been saved to the Company. But there is this great consolation that, by their persistence, the Company have escaped from what would have been a perpetual source of danger, and a constant nightmare to their Engineer.

If gas and water companies are to secure special protection against, and compensation for, damage to their distribution systems by electrolytic action, they must at once set about collecting actual instances of such occurrences *in this country*. Experience from America as to the doings of this insidious enemy has no weight with at any rate one Select Committee of the House of Commons, although it is not long since that another Committee appointed by an instruction of the House did not hesitate to accept for their guidance statistics in regard to the distribution of water gas in that country. In the foregoing paragraph, it is shown that the Brighton Gas Company were successful in obtaining protective clauses without the aid of a Parliamentary Committee; but, as will be seen by a report elsewhere, the South Metropolitan Gas Company and the Lambeth Water-Works Company were not so fortunate in connection with the London County Council (Electrical) Tramways Bill. For this result, inability to produce at the moment specific cases of damage in this country seems to be accountable. The Companies asked for protection clauses, and compensation in the event of injury; and they took exception to a clause in the Bill giving the County Council power to alter the position of their pipes and mains—the Companies reasonably claiming the right to do such work themselves. The appeals of Counsel and witnesses on these points had no effect. What the Committee wanted was evidence of actual cases of loss in this country occasioned by fusion or electrical action; and, in the absence of these, they declared that they were satisfied that the Bill and the existing legislation afforded ample protection.

The sound of the last words on the Morecambe Gas Purchase Bill had hardly died away on the afternoon of yesterday week when the attention of Sir T. Gibson Carmichael's Committee was invited by Mr. Balfour Browne to the Hartlepool Gas and Water Company's Bill. It was a meritorious case which he had to lay before the Committee in support; and in contrast, the case of the opposition sadly lacked point and stability. But this is not the fault of anyone engaged in its preparation. Where impeachable weaknesses do not exist, it is idle to expect a man to make a telling attack. The whole object of the West Hartlepool Corporation in appearing in opposition was to pave the way for an application next session for purchasing powers—in other words, they wanted to tie the hands of the Company by obtaining the insertion in the present Bill of a clause entitling them to come next session for a Purchase Bill without opposition on the part of the Company. Now let us see (dealing only with the gas undertaking) whether the Committee would have been justified in doing this. With a uniform rate of progression, the gas consumption has increased almost fourfold in the last twenty years; and at the present time, with discounts, the average charge for gas is a trifle over 2s. per 1000 cubic feet, which is a lower price than in three large neighbouring towns where the gas-works are owned by the Local Authorities. In only seven years out of the 54 of their existence, have the Company paid their maximum dividends of 10 and 7 per cent. Back-dividends have never been paid; and so far as can be ascertained, no claim has ever been made for them. This record shows that big dividends have been sacrificed to a very liberal consideration of the consumers, and that, as a natural consequence, a sound and continuously growing business has been assured. The prudent policy pursued by the Directors and their Engineer and Manager (Mr. Thomas Bower) has already stood the Company in good stead in the Parliamentary Committee Rooms; and it has placed before the West Hartlepool Corporation a stupendous task when they essay next session, if they continue in the same frame of mind as now, to prove to Parliament that the interests of the consumers will be better served by them than they have been by the Company. Returning to the present Bill, its purposes are to authorize the consolidation and conversion of the capital into 5 per cent. maximum ordinary stock, and to enable the Company to raise £200,000 additional capital, with the usual borrowing powers. The Corporation objected to the conversion on the ground that there would be an appreciation in the value of the stock, which would prejudice them in the event of purchase. When will local authorities disabuse their minds of this fallacy, and learn something of the fundamental principles which guide arbitrators in arriving at the price to be paid for an undertaking? Then they also objected to the amount of the new capital, and asked for a reduction. The insertion of a purchase clause, as already stated, was desired; and among minor points the Corporation requested a lowering of the maximum price, and the provision of an additional testing-station. So far as could be gathered, there was not a word of complaint against the administration of the Company—excepting that £2700 has been wrongly paid in respect of income-tax during the years of maximum dividends; and this the Company's Counsel has promised shall be entered in the accounts as applied towards the redemption of the amount due for back-dividends. In addressing the Committee at the close of the evidence, the opposing Counsel receded somewhat from the position previously taken up. He withdrew his objection to the conversion of the capital, and almost exclusively confined himself to asking for a reduction of the capital, and the insertion of a clause ensuring that nothing contained in the Bill should prejudice the Corporation in their application for purchasing powers next session. The only result was that the Committee deprived the Company of one-fourth of the proposed additional capital, and ignored the other requests of the Corporation. The curtailment of the capital to this extent will not harm the Company; and the Corporation have really gained little by it. Mr. Corbet Woodall and Mr. E. H. Stevenson were the professional witnesses for the Company; and Mr. W. A. M'Intosh Valon was retained on behalf of the Corporation.

The unpretentious Bill introduced this session by the Cleethorpes Gas Company came before a Committee of the House of Lords for a few minutes on Wednesday last; but, had it not been for the questionable action of the District Council, their Lordships would not have been troubled with the measure even for that length of time, and the Company and the ratepayers would not have been inflicted with unnecessary expense. Prior to this stage being reached, the Company had shown the utmost regard for the views of all interested in any way in the provisions of the Bill. The local Water Company had had protection granted to their supply in respect of the uses to which certain land is to be put which the Gas Company propose to acquire; and in the Bill as finally presented to the Committee, the interests of the consumers and of the District Council had been studied in a praiseworthy manner. In fact, it is difficult to discover in the Bill the slightest excuse for any antagonism. This being so, we can only suppose that the opposition of the District Council was prompted by a little vain ambition to take some part, however small, in the parliamentary proceedings; for the absolute weakness of their position was clearly shown by the course their Counsel took almost immediately after the Bill was introduced to the Committee. The main features of the Bill are the conversion and consolidation of the capital into 5 per cent. stock, additional money powers to the extent of £60,000, with authority to borrow one-third, the adjustment of the sliding-scale, the reduction of the standard price from 6s. to 4s., and the acquisition of further lands. There are a number of other clauses which will contribute both to the advancement of the Company's business and the benefit of the consumers. The Company have a particularly clean record; and selfishness has not by any means been a prominent trait of their policy. Although by their Order of 1879, the Company possessed sliding-scale powers, with an initial price, as already stated, of 6s., they have never, even partially, exercised their rights. The present price of gas is 3s.; but they have never divided more than 10 and 7 per cent. As Mr. Corbet Woodall (who supported the Bill) pointed out to their Lordships, the Company were actually entitled, at a charge of 3s. and with their high standard price, to pay a dividend on the 10 per cent. shares of 19 per cent. and on the 7 per cent. shares of 16 per cent. During the recapitulation of the heads of the Bill by the Company's Counsel, and a few minutes' evidence by Mr. Woodall, the Counsel for the opposition wisely saw that there was nothing they could honestly contend for, excepting a slight additional reduction of the standard price; and overtures resulted in a ready agreement to cut it down by a further 3d., which makes the initial figure the same as in the neighbouring town of Grimsby. The opposing Counsel then withdrew; and their Lordships said the Bill might proceed. The whole affair was a perfect farce; and it is to be regretted that those who are responsible for folly of this kind cannot be made to pay the expenses which their action entails.

We must congratulate the Heysham District Council upon the fact that they do not stand alone in entertaining the queer notion that an outlying Local Authority within the area of a gas undertaking which is being acquired by a Corporation should not be called upon to pay anything more than the mere value of the pipes, should they at any time wish to purchase the part of the system within their own district. Street, which is adjacent to Glastonbury, is governed by a District Council, who foster a similar view. The Glastonbury Corporation and Gas Company (both of whom had Bills before Parliament this session) have, as announced last week, entered into a covenant for the transfer of the gas undertaking; and, before a Committee of the House of Commons last Friday, Street raised certain objections to this agreement, for the ostensible purpose of getting themselves placed in a better position in regard to purchase than they were in under the Company. We can quite understand the District Council having a preference for being supplied with gas by the Company rather than a neighbouring Authority, and we have sympathy with their disapproval of the proposal that the ratepayers of Glastonbury should benefit from the surplus profits, seeing that a considerable proportion of such profits will be derived from the consumers of Street, while, if the undertaking remained in the possession of the Company, the chances would be greater of reductions in price, in which benefits the consumers of Street would share equally with Glastonbury. Thus far we go with Street; but that they should be allowed to purchase the portion of the gas pipes and mains in their district at their mere pipe value, without any other consideration, is a proposition with which we must decline to identify ourselves. For their present position, Street is entirely to blame. They knew that the Glastonbury Corporation were promoting a Purchase Bill; and, if they had gone the right way to work a few months ago, instead of waiting until they entered the Committee room last Friday, it is quite possible that there might have been a Glastonbury and Street Gas Board before the end of this year. However, under the Corporation Bill, the District Council still possess the powers of purchase that they obtained in a Provisional Order some years ago; and it will be for them to make the best use of this lever, if they desire to become partners in the concern in the future. The preamble of the Corporation Bill was passed by the Committee; but they have reserved until to-morrow morning the acceptance or rejection of clauses to be brought before them by Street embracing the following: The Chesterfield clause as to the appropriation of surplus profits, an equality clause as to price, the limitation of the reserve fund to 10 per cent., a maximum price of 4s., and the apportionment of the sinking fund between the two districts according to

the consumption of gas, so that, in the event of Street purchasing the part of the undertaking in their area, they may be credited with their share of the fund. This last requirement will no doubt give rise to some spirited argument. Mr. E. H. Stevenson and Mr. W. A. Valon were present on behalf of the parties to the transfer agreement; and Mr. H. E. Jones was retained to watch the interests of Street.

Last week attention was called to the fact that this session the term allowed for the repayment of costs incurred in the promotion of Bills has been reduced, save under exceptional circumstances, from ten to five years. In this connection it is interesting to note that the Ossett Corporation have been allowed ten years for re-paying the costs of their Gas Bill, and 45 years for the money required to complete the purchase of the gas-works. According to Mr. E. H. Stevenson, the limitation to five years will make it difficult for any local authority who acquire a small gas undertaking to derive from it, under present circumstances, any surplus profits during that period.

As originally drawn, the North Warwickshire Water Bill contained clauses conferring upon the North Warwickshire Water Company certain powers to which the Coventry Corporation objected, as mentioned last week. These clauses have now been struck out of the Bill; and the Company have undertaken to insert an additional clause saving any rights the Corporation possess to sink wells and take water from any area within their own limits. The Corporation have therefore withdrawn their opposition.

The London Hydraulic Power Company obtained an Act in 1884 which very largely extended the district in which they were authorized to supply hydraulic power, and in which district they had the usual power of water companies to break up streets for the purpose of laying pipes. In this Act there was also power to extend the mains and works outside the defined area with the consent of the Metropolitan Board of Works (now the London County Council) and the Vestries concerned. Under the Act, the mains of the Company have been laid throughout the defined area; and, with the consent of the Local Authorities, have been extended largely outside in order to supply the demand that arises from time to time for hydraulic power. Until recently all the Vestries acted in a reasonable manner as regards their consent; but some few of the Vestries during the last year or two have imposed conditions on their assent which the Company consider oppressive. A Bill was promoted by the Company this session in order to permit an appeal to the Board of Trade in the event of unreasonable action on the part of the Vestries. Many of the principal Vestries interested did not petition against the Bill; but some of the other Vestries did, and also the London County Council. The claim made by the Council was that the clause of the Act of 1884 requiring the assent of the Metropolitan Board of Works constituted a parliamentary bargain which should not be upset unless obstructive action could be shown. As it was admitted by the promoters that, as far as the County Council were concerned, they had done nothing to which the Company could object, the petition of the Council was successful; and the Committee found the preamble of the Bill was not proved.

HOUSE OF LORDS.

The following further progress was made with Private Bills last week:—

Bills reported, with amendments: Great Berkhampsted Water Bill, Motherwell Water Bill, Newport (Mon.) Gas Bill.

Bills read the third time and passed: Higham Ferrers Water Bill, Menstone Water (Transfer) Bill, Otley Urban District Council Water Bill.

The opposition to the Fishguard Water and Gas Bill, the Kingston-upon-Thames Gas Bill, and the Newtown and Llanllwchaiarn Urban District Gas Bill was withdrawn.

The Dorking Water Bill was referred to a Select Committee, consisting of Lord Clifford of Chudleigh (Chairman), the Earl of Portsmouth, the Earl of Romney, Lord Hatherton, and Lord Seaton; to meet on Thursday, March 22.

HOUSE OF COMMONS.

Thursday, March 22.

THE LONDON WATER SUPPLY BILLS.

The London Water (Purchase) Bill, the London Water (Welsh Supply) Bill, and the Metropolitan Water Companies Bill were on the paper for second reading to-day, "by order." On the order in regard to the first-named Bill being read, Mr. J. Redmond appealed to the promoters and opponents of the Bills to postpone the consideration of them, as the Irish members had obtained this day, by arrangement with the Government, for the discussion of the financial relations between Ireland and England. The Speaker asked Mr. Stuart, who was in charge of the first two Bills, what he purposed doing. He replied that the London Water Bills had been put down before any such arrangement as that referred to had been arrived at. However, he was quite in the hands of the House, and was prepared to shorten the debate or postpone it. A disorderly scene, caused by the Irish members, ensued; and eventually, on the suggestion of the First Lord of the Treasury, the debate was adjourned for a week.

Friday, March 23.

THE SUPPLY OF WATER GAS IN DUBLIN.

Mr. T. M. Healy asked the President of the Board of Trade if his attention had been called to the published report of Professor E. Reynolds, of Trinity College, Dublin (see *ante*, p. 756), warning the public of his discovery that the Dublin Gas Company, without notice to the citizens or the Corporation, had turned 17 per cent. of carbon monoxide into their mains. He inquired further whether the Board of Trade received any notice of this intermixture of water gas with coal gas in Dublin; and whether the President was aware that water gas was the most deadly gaseous poison known, was absolutely fatal to animal life, and that its use as an illuminant had been made illegal in many American States; also that leakages from the Dublin mains were constant, and that since the introduction of water gas the death-rate among the population had risen so enormously that the Lord Lieutenant had appointed a Commission to investigate the cause. He wished to know if the right honourable gentleman had any information to show whether the poison from water gas was cumulative in the human system, and whether any remedy known to science existed for cases of even partial poisoning; and if the Government would take any steps to protect the public from the admixture of this product with ordinary coal gas.

Mr. Ritchie: I have not seen the published report to which the honourable and learned member refers; but I understand that Professor Reynolds, in a lecture at Trinity College, recently made some observations as to the increased proportion of carbonic oxide in the gas supplied in Dublin, due to the admixture of carburetted water gas with coal gas. The Board of Trade received no notice of the intention of the Gas Company to make any alteration in the nature of the gas, nor are the Company required to give such notice; but they have now informed the Board that the plans of the necessary works were submitted to the Corporation, and their purpose explained. I am not aware that the use of water gas has been made illegal in any American State; but, from the report issued last year of a Home Office Departmental Committee who inquired into the question of the supply of water gas, it appears that in the United States carburetted water gas is very largely used, and formed in 1896 about 70 per cent. of the total gas supply. The honourable and learned member will, by a perusal of the report, obtain much information with reference to this interesting subject which it is impossible to summarize in an answer to his question. The Local Government Board for Ireland inform me that they are not aware whether the high death-rate is in any degree attributable to the alleged leakage of gas. The Commission appointed by the Lord Lieutenant has directed its inquiries into the general causes of the death-rate; and pending the report of the Commission, the Board can express no definite opinion on the point.

Mr. Healy asked if there was any difficulty in granting to Irish members such a Committee as that which was nominated for the London members with regard to the gas in the Metropolis.

Mr. Ritchie replied that if the honourable and learned gentleman would call at the Board of Trade, they would be glad to put before him all the information they possessed.

The following further progress was made with Private Bills last week:—

Lords Bills read the first time and referred to the Examiners: Menstone Water (Transfer) Bill, Otley Urban District Council Water Bill.

Bill read a second time and committed: Rickmansworth and Uxbridge Valley Water Bill.

Bills reported, with amendments: Hartlepool Gas and Water Bill, Morecambe Urban District Council (Gas) Bill, North Warwickshire Water Bill, Southport Water Bill, Spalding Urban District Council (Water) Bill, Wetherby District Water Bill.

The Standing Orders Committee recommended that the Portland Urban District Council should be permitted to deposit a petition for a Bill.

The Chairman of Ways and Means (the Right Hon. J. W. Lowther) reported from the Committee on the Grantham Gas Bill that a report from the Secretary of State for the Home Department relative to clause 41 of the Bill (power to inspect gas-fittings in new buildings) had been considered by them; and that they had inserted amendments in the clause providing for the statement by the Company of their requirements as regards pipes and fittings if requested prior to the commencement of the work, and as so amended had passed the clause.

The Poplar District Board of Works have presented a petition in favour of the Gaslight and Coke, Commercial Gas, and South Metropolitan Gas Companies Bill.

The Vestry of St. Mary Abbotts, Kensington, have petitioned, without asking to be heard, against the London Water (Purchase and Welsh Supply) Bills.

Kempston Gas Company, Limited.—The annual meeting of this Company was held on the 17th inst., when the Directors reported a balance of £136 available for distribution; and they recommended the payment of a dividend of 6 per cent., free of income-tax. Owing to the increased demand for gas, an auxiliary supply has been obtained from the Bedford Gas Company. The Directors believe that the abolition of meter-rents has had a good effect, and stimulated the demand for gas. The dividend recommended was declared.

Fatal Accident at the East Greenwich Gas-Works.—Last Tuesday, an inquest was held at Greenwich on the body of George Wilmot, who met his death at the East Greenwich Gas-Works. Mr. Passmore appeared for the South Metropolitan Gas Company; and Mr. Joseph Owner, Inspector of Factories, was present. The evidence showed that the crane driver was working the crane, to which was attached a skip weighing, when loaded, about 18 cwt. When the skip was about 8 feet from the bottom of the hold of the barge, the driver attempted to hoist and swing it at the same time, when the clutch came out, and the skip fell on to deceased and another man. No reason could be assigned for the clutch coming out; and nothing could be done, as the driver had one hand on the reversing lever and the other on the screw lever. He placed his foot on the brake as soon as he saw the skip going down; but it was too late. The crane was not worked regularly every day, as there were travelling cranes on the wharf. New clutches were square, and the one which caused the accident was worn at the corners. Dr. Hugh Davies deposed to deceased's external injuries, and said that, in his opinion, death was instantaneous. At the request of Mr. Passmore, Mr. J. Tysoe, the Superintendent of the Works, was examined. He deposed that the crane referred to was in good working order; and that the clutch, if properly placed, could not come out of position. The slight wearing of the clutch would not affect in any way the safety of the crane if the clutch were properly placed. He attributed the accident to the fact that the clutch had not been properly put in. The Directors of the Company were always anxious to have the best possible machinery. The Jury found that death was caused by "injuries sustained from a skip of lime having accidentally fallen on deceased while it was being raised by a crane, and that the skip fell owing to the worn condition of the clutch." It was understood from Mr. Passmore that the Company would provide for the widow of the deceased.

HOUSE OF COMMONS COMMITTEE.

Friday, March 23.

Before Mr. SCHWANN, *Chairman*, *Mr.* MOON, *Mr.* DOOGAN, *Commander* BETHELL, *and Mr.* BONHAM CARTER, *Referee.*)

GLASTONBURY CORPORATION GAS BILL AND GLASTONBURY AND STREET GAS BILL.

The object of the Corporation Bill was to enable the Glastonbury Corporation to buy up the undertaking of the Glastonbury and Street Gas and Coke Company. The Bill was one of ordinary purchase, and the Corporation of Glastonbury had come to terms; so that the main opposition to the Bill had disappeared. The terms of agreement were that the purchase should be under the Lands Clauses Act; that a sum of £200 be allowed by the Corporation for winding-up expenses; the Corporation to pay £625 towards the costs of the Company; servants of the Company to be protected; and the Company's Bill to be withdrawn on the preamble of the Corporation Bill being passed. The only opposition was that of the Street Urban District Council, whose district immediately adjoined Glastonbury.

Mr. WEDDERBURN, Q.C., and Mr. F. N. KEEN appeared for the Glastonbury Corporation. Mr. J. D. FITZGERALD, Q.C., and Mr. FORBES LANKESTER represented the Street Urban District Council. Counsel were reserved on behalf of the Glastonbury and Street Gas Company.

Mr. WEDDERBURN, in opening the case for the Corporation, said that the area of the Company consisted of the borough of Glastonbury and the small district called Street. The supply of gas was originally authorized in 1892, by the Glastonbury and Street Provisional Order. When the Glastonbury Corporation effected the purchase, they would acquire power over the area of the borough of Street; and after the purchase, Street would be on exactly the same terms with the Corporation as they now were with the Company. What was proposed would not affect them in the slightest, because in the present Bill there was inserted *mutatis mutandis* exactly the same clause as was in the Provisional Order of 1892, under which Street could at any time buy their portion of the undertaking. The ground of their opposition was, first, that they should have a special purchase clause—one better than they could ever have secured from the Company—which would enable them to buy the works and mains in their district at the price of old iron. Why this should be demanded, he could not conceive, because the Glastonbury Corporation had to purchase the mains from the Company, with goodwill attached, as part of a going concern. The mere fact that the undertaking was going to change hands was no ground for making an alteration in their position. Then the petitioners submitted that the proposals of the Bill were not in the interests of the gas consumers. Clause 52, they said, provided for the carrying of any surplus profit to the district fund, instead of in reduction of the price of gas; and as the Corporation of Glastonbury had no duties or obligations to perform towards the inhabitants of Street, the District Council apprehended that the interests of the consumers in their district would be sacrificed to those of the Glastonbury ratepayers. It was true Glastonbury proposed to carry surplusses, if made, to the district fund. Street said they should have a share in that. But while Glastonbury were going to pay a large price for the concern, and take a heavy responsibility, Street proposed to take no share of this responsibility. Street lost nothing, and should gain nothing. If they thought this was such a profitable undertaking that they would be able to reduce the rates, let them buy from Glastonbury, as they were empowered to do—but on the same terms as they could have bought from the Company.

Mr. *John Baily*, Mayor of Glastonbury, gave evidence in formal proof of the preamble. The position of Street was in no way affected under the Bill, because the same clause was inserted as to purchase by them as was in the Provisional Order.

Cross-examined by Mr. LANKESTER: Street was growing at a much greater rate than Glastonbury; Street being a developing place. Last year, he should say Street consumed one-fifth and Glastonbury four-fifths of the total production of gas. The negotiations for the purchase began in June last; but no suggestion was made to Street that they should join in it. The works would be managed to the advantage of Street as well as Glastonbury, because the price of gas would no doubt be reduced.

Mr. LANKESTER: When you have raised the capital, bought the concern, and paid off instalments of interest and sinking fund, and the undertaking comes into your hands, you, Glastonbury, will have it; and the Street consumers, who paid their proportion of the sinking fund and of the interest, will have no property in it?

Witness: No.

The consumers of Street will have paid the interest on capital and instalments on sinking fund; and at the end of the term, when the sinking fund has paid off the whole of the debt, they will have no property in the works they have paid for—do you think that is fair?—I think it is fair.

And also, if there are profits beyond what are sufficient to pay interest on capital and sinking fund, you think it is fair that Glastonbury should monopolize the whole of the profits?—Yes. Street consumers, however, will only pay for what gas they consume. I have not read the Bill or its provisions; but I think it a fair Bill.

Re-examined: He knew the main objects of the Bill; and the desirability of carrying it out had been discussed at many public meetings, which had approved of it. It would have been quite open to anyone from Street to have attended these meetings and discussed the Bill. The Street people could have summoned their own meetings, and taken their own course.

Mr. WEDDERBURN said if there was any question as to Street being charged a differential price, the promoters were prepared to give clauses ensuring perfect equality in the rates of charge.

Mr. *Morland*, Deputy-Mayor of Glastonbury, said the population of the place in 1891 was 4119; and it was estimated in 1899 to be 4417.

Mr. FITZGERALD said the population of Street in 1891 was 3517; and it was estimated now at a little over 4000.

Further examined, witness said the proposal of Street seemed to be a case of "Heads I win, tails you lose;" for they proposed to share in any advantage and run none of the risks of the purchase.

Cross-examined by Mr. FITZGERALD: It had always been open to Street to approach Glastonbury to join in the purchase; but they never did so. Glastonbury did not approach Street, because their Parliamentary Agent said there were difficulties in the way of setting up a joint authority. There was no provision that the profits should go in reduction of the price of gas; but there were forms of compulsion outside the Bill, in the borough, which would cause the bulk of the profit to be devoted to that purpose. The provision that the profits should go to reduce the district rate of Glastonbury was a theoretical, not a practical matter. There were about 800 ratepayers in Glastonbury; but he could not tell the number of gas consumers.

[A later witness stated that the number was between 300 and 400.]

Witness (continuing) said he was absolutely certain the profits would mainly go in reduction of the gas-rates. The Corporation were ready to bind themselves that the price of gas in Street should not be greater than in Glastonbury.

By Commander BETHELL: The Corporation of Glastonbury ran the risk of having to pay from the rates if the revenue for the next few years was not sufficient to meet the costs of the present Bill, or if the profits were not enough to pay the interest and provide for the sinking fund. The maximum price of 4s. 6d. per 1000 cubic feet in the Bill was that at which gas, until very recently, had been sold in Glastonbury.

Mr. MOON: If we authorized you to pay off the costs of the Bill in a certain number of years, would you be prepared to drop your proposal that the ultimate profits should be carried to the district fund?

Witness: I do not in that case see where the advantage to the ratepayers of Glastonbury would come in.

No; but it would be more fair to Street, would it not?—I do not think it would be fair, unless they offered to bear their share of the risk.

Quite so. They would, on the footing I propose. The cost of the Bill would be paid off out of profits; and then I suggest that, instead of the ultimate profits going to Glastonbury, from which Street obtains no benefit, there would be a reduction in the price of gas?—But in that case we might be compelled to carry on the supply at a loss.

The maximum of 4s. 6d. per 1000 cubic feet is a very high price?—But supposing we, as managing the gas-works, say we will charge 3s. 6d., we make a loss. This loss, under your proposal, would fall, not upon Street, but entirely upon Glastonbury.

But I assume you would not lower your price so as to inflict a loss?—I think a margin for possible mistakes is usually allowed in all business transactions.

You have that by the power to make a reserve fund equal to one-fifth of your capital?—I am afraid that is a little more technical than I can follow. Gas is being sold at 4s. per 1000 cubic feet, with concessions to large consumers.

Mr. *E. H. Stevenson* said it would be most inequitable that Street should be given power to purchase, not on the terms on which they would have bought from the Company, but on better terms—viz., without any allowance for goodwill. The clause was never put in now, except when one authority went into the district of another. He knew of no case in the last seven years where such a clause had been inserted. Glastonbury, when buying from the Company, would have to pay for goodwill, as regarded both Street and Glastonbury. It was not proposed under the Bill to alter the position of a single consumer in Street. He did not think the fact that surplus profits might be used to go to a reserve fund or to reduce the rate, instead of going to swell a dividend, made any difference to the consumers in Street. The Company were now selling gas at 6d. below their standard price. They could therefore divide 1½ per cent. more without making any reduction in price. There was absolutely no law which could compel them to reduce the price of gas one farthing; and they could carry forward any balance they liked. The Company had been charging 4s. 6d. per 1000 cubic feet, and only recently 4s.; so that quite lately there would have been no margin on the maximum of 4s. 6d. at present proposed. Any surplus after the purchase would go first to meet sinking fund, then to reserve fund, and finally in reduction of rates. He was certain that for the period—five years—in which the costs of the Act had to be paid off, Glastonbury would have to provide from the general rates for the gas concern; and if the price of coal remained as high as it was now, they would lose long after that period. It was not desirable that local authorities should make merely a slight profit, because this would mean that the price of gas would have to be altered from year to year with changing circumstances, which would greatly check the consumption of gas. He knew of no precedent for the suggestion that a gas authority purchasing a company should not make a profit.

Cross-examined by Mr. FITZGERALD: With reference to his last statement, he agreed there was a clause in the Chesterfield Act that the surplus (if any) should be applied in reduction of the price of gas, when and as circumstances should permit that to be done. The West Ham Gas Company was the only one which was prohibited strictly from carrying forward a profit. There the amount carried forward was to be equal to only 1d. per 1000 cubic feet; and the consequence was that the price had not been altered since 1879. With so slight a margin, they had not felt sufficiently safe to do so. The Burghs (Scotland) Gas Act said the revenue and expenditure were to be balanced as nearly as possible. This tended to continual variation in the price. The result was, he agreed, that profits could not aid the rates, but must ultimately go to reduce the price; but then there was no maximum price. Outside local authorities did not like that; and Street would not care to put themselves under Glastonbury with an unlimited price for gas. If Glastonbury could not have an unlimited price, they ought not to have the possibility of permanent loss thrown upon them. It was only honest that, if they were not to make a profit, they should not make a loss.

Re-examined: The facts of the Chesterfield case had no bearing whatever on the present one. Joint boards for gas purposes seldom lasted any length of time.

By the CHAIRMAN: Corporations very rarely carried forward balances. Sometimes they applied balances to reduce the rates, sometimes to extend the business; but if the demands of Street were granted, Glastonbury would be unable to use their balance to build up the undertaking. It was to the advantage of Street, as well as of Glastonbury, that the works should be so built up, and the capital invested not unduly increased. There were many places where the price of gas was as high as 4s. 6d. per 1000 cubic feet.

This closed the case for the promoters.

Mr. FITZGERALD, for the Street Urban District Council, said he should not call any evidence. At present there was equality between the two districts, because, under the sliding-scale, the same price must be charged throughout the whole area, and a reduction must therefore affect Street equally with Glastonbury. He had heard no reason why Glastonbury should seek to purchase the whole undertaking without consulting the Street people. In his experience, where a gas or water company supplied a large district comprising a number of local authorities, the practice was, unless one of the districts was very much larger than the others, to form a joint board, and enable all the authorities who desired to share in the joint purchase. He proceeded to inform the Committee of a number of cases in which joint boards, in regard both to the supply of gas and water, had been set up; among the instances cited being those of Accrington, Chesterfield, Hebden Bridge, and (in the present session) Airdrie and Coatbridge. In the Chesterfield case, the Company supplied the districts of a number of authorities; but some of the authorities did not desire to join, and so the board was formed of those that did. A provision was entered into that the surplus profits should go in reduction of the price of gas; and this provision operated for the benefit of every consumer, whether he dwelt within the district of one of the constituent authorities of the board or not. The advantage of a joint board was that it enabled all the parties to come in on equal terms. There was no allegation that the Glastonbury Company were not doing their duty, or were not well managed; and therefore no advantage could be gained by the transfer. He submitted that the Bill ought not to be sanctioned, if it would have an injurious effect upon Street; and it would have such effect, because, while now there was perfect equality between Street and Glastonbury, there would not be equality in the future if the Bill passed. The profit, now that the standard had been reached, must come under the sliding-scale, and (if the Company were to pay an increased dividend) go in reduction of the price; and he pointed out that of the excess profit the large bulk would go to the consumers. In the near future, the consumers of Street could look forward to a reduction of price, and to sharing largely in the surplus profits. Under the Bill, there was an end to this. There was no sliding-scale. There was a maximum price; but all profits were to go to the district fund, and therefore the consumers in Street were placed in an entirely different position, because they would have no interest at all in the profit. The only Public Act dealing with the transfer of gas companies to local authorities, directed that all profit must go to reduce the price; and this principle had certainly been recognized by Parliament. The money to provide interest and sinking fund would be paid equally by Street and Glastonbury; but at the end of 45 years, the Glastonbury Corporation would have the works free of charge—though half the money, or thereabouts, would have been provided by Street consumers. Then power was taken to form a reserve fund out of revenue, amounting to one-fifth the capital employed. One-tenth, however, was the usual proportion; and he saw no reason why it should be exceeded. This fund would also be partly provided by Street; but it would only benefit Glastonbury. With regard to the "pipe" clause, he agreed that in some cases it was inequitable. But in this instance, if they allowed the Bill to pass without it, they would do serious injustice to Street, because they would be allowing Glastonbury power to supply gas in another district against their will, without any opportunity having been given to that district to join in the purchase; and Street, if they ever wished to undertake the supply of gas, would have to buy that right from Glastonbury. This was not, however, a case in which there should be two separate gas-works; there being two towns adjoining, which together had a population of only 8000 or 9000. If the Bill passed, the chance of getting a reduction in price vanished for many years. This appeared to be a fatal objection; and he therefore asked the Committee not to sanction the Bill.

Mr. KEEN contended that the cases of joint boards which had been quoted had no application in the present case. In those instances, several authorities were combining to bear the burden; whereas here one authority alone were proposing to do so. The reason it was proposed to devote surplus profits to the reduction of the district rates, was that one authority was undertaking the whole responsibility of the purchase, and would have to meet any deficiency which might arise.

The CHAIRMAN (to Mr. Fitzgerald): Would you be satisfied with the Chesterfield clause?

Mr. FITZGERALD said that this clause would make a great difference. In further reply to the Committee, he stated that if the Bill itself were not rejected, the clauses he should ask for would be the Chesterfield clause, as to the appropriation of surplus profits; the equality clause, as to price; the reserve fund to be limited to 10 per cent.; the maximum price to be 4s. per 1000 cubic feet; the sinking fund to be divided according to proportion of gas sold between the two Authorities; and in the event of purchase by Street of their portion of the undertaking, Street to be credited with their proportion of the sinking fund. The latter was a provision which had been inserted in the Ossett Bill this session. It worked so that each authority, as the sinking fund was built up, was credited with having provided so much of the fund as was shown by its proportion of the consumption of gas. Then, if ever Street should purchase their share of the undertaking, they would be credited in the purchase with their share of the sinking fund.

The room was then cleared. On the re-admission of the public,

The CHAIRMAN said: The Committee have decided that the preamble of the Bill is proved; but we look to the opponents to bring up clauses embodying the suggestions which they have to make, and the Committee will decide what to accept or not, and the form.

The Committee then adjourned further discussion on the Bill till to-morrow (Wednesday).

At the meeting yesterday week of the Liversedge District Council, a deputation was appointed to confer with representatives of the Heckmondwike District Council as to the desirability of acquiring the works and powers of the Heckmondwike Gas Company.

It has been decided by the Lighting Committee of the Corporation of Newcastle-on-Tyne to require all tradesmen who have erected gas-lamps on the kerbs in front of their shops to keep same lighted full on during the night, or burning at least 2 cubic feet of gas per hour.

HOUSE OF COMMONS COMMITTEE.

Monday, March 19.

(*Before Sir* T. GIBSON-CARMICHAEL, *Chairman, Sir* W. CAMERON GULL, *and Mr.* HORNIMAN.)

MORECAMBE URBAN DISTRICT COUNCIL GAS BILL.

The consideration of this Bill, the opening proceedings on which were reported last week (p. 751), was concluded to-day.

Mr. BALFOUR BROWNE, Q.C., and Mr. HONORATUS LLOYD represented the promoters. Mr. MOON appeared for the Morecambe Gas Company against any alterations in the Bill; and Mr. BLENNERHASSETT, Q.C., and Mr. HULTON, for the opponents, the Heysham Urban District Council.

The CHAIRMAN informed Mr. Blennerhassett that the Committee desired that, in any further evidence which was to be given on behalf of the Heysham Urban District Council, attention should be directed to the question whether the Heysham people would be any the worse off, supposing the Bill were passed as it stood, in making a bargain with the Morecambe Authority, than they would be in bargaining with the Gas Company, with whom they would have to arrange if they wanted to start a gas-works at the present moment. Another point to which the Heysham evidence should be directed was whether, if the Morecambe people had made a bad bargain, an Arbitrator would or would not take that into consideration.

Alderman *Monkhouse*, Accountant, of Kendal, said his estimate of the total cost of buying the Gas Company under the terms proposed in the Bill was £160,000. At present, the Company had to pay interest on a comparatively small capital; but if the purchase was carried out, Morecambe would have to pay interest on a capital nearly four times as large, and redemption as well. This would compel them to raise the price of gas from 3s. 3d. to 3s. 11d. per 1000 cubic feet; and Heysham consumers would, of course, have to pay this enhanced rate. Clause 18 was unfair to Heysham, and would impose much too onerous terms upon that Authority, in case they wished to buy. He preferred the Model Clause.

Mr. *A. Silverthorne* said that, if he were sitting as Arbitrator, when Heysham acquired the right to supply in their district, he would look to the price paid by Morecambe as the first thing. Any Arbitrator would naturally assume that Parliament considered the price to be an equitable one, or it would not have passed the Bill; whereas the price was startlingly improvident, and there was no precedent for it. He unhesitatingly said that this was a purchase at the rate of 41 years. If the Model Clause were followed, Heysham would only have to pay Morecambe £2000 for the part of the undertaking within their district; but if clause 18 were adhered to, a purchase would cost Heysham £15,000. The agreement to purchase was peculiar in its terms, and would naturally lead to an extravagant price being fixed. One of the clauses said that, in the event of an arbitration, it should be an instruction to the Arbitrator "that in determining the value of the undertaking, regard shall be had to the improving value of the undertaking." The parties having agreed to terms, of course this clause had now gone; but it explained the price that had been arrived at. During the last 25 years, he had never seen any such stipulation in an agreement to purchase, except perhaps in the Yeovil case. He had taken out the profits of the Company per ton of coal carbonized. In 1897, they were over 16s., in 1898 over 12s., and in 1899 over 15s. This scale of profit indicated that something in the internal administration of the Company was not quite right. He considered, for one thing, that the undertaking was not properly assessed to the rates; it was, in fact, ridiculously under rated. With such an exorbitant profit as 15s. per ton of coal, the Company made a profit last year of £5484; but bringing the profits down to a rational standard, by properly rating the concern and so on, there should only have been a profit in 1899 of £3618. If the purchase was effected, Morecambe would have to meet an annual charge for interest and sinking fund of £7255; so that, with what he contended were the normal expenditure and the normal profits, there would be a deficiency of nearly £4000, which would have to be met either by raising the price of gas or by a rate-in-aid.

Mr. LLOYD, in cross-examination: If the District Council of Heysham were to come to Parliament desiring to get out of the Company's jurisdiction, would they not have to purchase under clause 18 or some similar terms?

Witness: They would.

The only way in which Heysham could get rid of the Gas Company's monopoly in their district, would be by buying upon these terms the part of the undertaking which is within their district?—They would not buy, because they would have to pay for the monopoly.

Do you tell the Committee that the Heysham district is in this position—that it never can hope to have gas-works of its own?—It certainly cannot. It is not large enough to do so with advantage.

In further cross-examination, witness stated that 25 years' purchase was the proper basis to take for this Company. Their earnings were well secured, but not so well secured as if electricity had not been introduced. In the Ambleside case, in which he was concerned, the Arbitrator did not take witness's view of the value of the undertaking, and awarded a sum which, though much below what was claimed on the other side, might work out to 34 years' purchase. But witness's views had since been corroborated by the fact that rates-in-aid had had to be raised. Gas could not hope to continue its successful competition with electricity if extravagant prices were to be paid for gas undertakings and rates-in-aid were rendered necessary.

In reply to an intimation from the Committee,

Mr. *Newbigging* was re-called on behalf of the promoters. He said he calculated that the first year after purchase the Morecambe Council would have to find £7249 for interest and sinking fund; and he reckoned that, putting 5s. 6d. a ton for the extra cost of coal, and allowing for the natural increase in the supply, the profits, including the savings in Directors' fees, &c., for the first year would certainly reach within £100 of this amount. He had never known a statutory concern bought more cheaply than the price agreed upon for the Morecambe Company. Very few transfers paid during the first year of the change.

Mr. BLENNERHASSETT, addressing the Committee on behalf of Heysham, said there was no public need for the Bill; and he hoped therefore the Committee would reject it altogether. But if it were passed, he trusted

the Committee would protect Heysham by imposing the Model Clause upon the promoters, in place of clause 18.

Mr. BALFOUR BROWNE, in replying for the promoters, stated that the profits for 1899 were £5484. The past year's increase was 29½ per cent.; and as the Company's business had for years been growing rapidly, he thought it would be a moderate calculation to assume an increase next year of 25 per cent. This would mean an addition of £1371. Then the Morecambe Council could raise money at a very much cheaper rate than the Company—namely, at 4d. per 1000 cubic feet, as compared with 1s. 3d.—and this would mean a saving of £779. Altogether, according to this calculation, the Council might look forward to an income of £7634 with which to meet Mr. Newbigging's £7249, without taking credit for the saving in Directors' fees, or anything of that sort.

The COMMITTEE, after a short deliberation, decided to pass the Bill, on the condition that the promoters would insert clauses dealing with the charges in Heysham, and with the objection of the Local Government Board in regard to the payment of the sums raised by the Company on mortgage.

Mr. BALFOUR BROWNE said the Lord Chairman had held that it was better to let the mortgage stand as it was.

Mr. MOON said that, the money being raised by bonds payable at variable dates, they could not be converted as suggested by the Board.

Mr. BALFOUR BROWNE suggested that the best thing to do would be to provide a sinking fund against these bonds when they fell due.

To this the Committee agreed; and also to Mr. Balfour Browne's clause prohibiting a higher price to be charged in Heysham than was charged in Morecambe under similar circumstances.

HOUSE OF COMMONS COMMITTEE.

Monday, March 19.

(*Before Sir* T. GIBSON-CARMICHAEL, *Chairman, Sir* W. CAMERON GULL, *Mr.* ORR-EWING, *and Mr.* HORNIMAN.)

HARTLEPOOL GAS AND WATER BILL.

This was a Bill to consolidate and convert the capital of the Hartlepool Gas and Water Company, and to enable the Company to raise additional moneys in order to carry out works already authorized.

Mr. BALFOUR BROWNE, Q.C., Mr. CLAUDE BAGGALLAY, Q.C., and Mr. RUSSELL GRIFFITHS appeared for the promoters. Mr. PEMBER, Q.C., Mr. WEDDERBURN, Q.C., and Mr. LANKESTER represented the Corporation of West Hartlepool.

Mr. BALFOUR BROWNE, in opening the case, said the Company had done their duty in the past; and there had not been a single word of complaint made about them. The only petitioner against the Bill was the Corporation of West Hartlepool, which formed part of the district of supply; and the Corporation made no complaint. The Company was incorporated in 1846, when the population of the district was between 4000 and 5000. The capital was at that time authorized to be £9000, with a maximum dividend of 10 per cent. In 1849, the Company was re-incorporated; and £25,000 was added to the capital, also with a maximum dividend of 10 per cent. In 1855, the Company was again re-incorporated; and the capital was brought up to £100,000—the new capital (£66,000) being entitled to a maximum dividend of 7½ per cent. In 1867, another Act was passed extending the limits of supply, and authorizing the raising of an additional £100,000. This capital was entitled to a maximum dividend of 7 per cent. The Acts of 1855 and 1867 each empowered the raising of £25,000 loan capital. In 1874, the Company had an Act for water purposes authorizing new works; and in 1878, by another Act, the capital was increased to £400,000 all told—£100,000 of the new capital being relegated to gas purposes, and the other £100,000 to water purposes. This was the first time in the history of the Company that the capital was ear-marked. This new capital was also entitled to 7 per cent. In the same Act, £50,000 of loan capital was authorized. In 1890, the Company came to Parliament for power to enlarge their gas-works, but did not ask for an increase of capital. In 1898, they were again in Parliament, mainly for the water-works. The capital was then increased by £80,000, with a maximum dividend of 7 per cent., which was ear-marked for water purposes; and the Company were by the same Act empowered to borrow £20,000. As things now stood, the Company had been authorized to raise £480,000 of share capital, of which £390,000 had been paid up; and £120,000 of loan capital, of which £36,500 remained to be raised. The Bill was an absolutely essential one, as more capital was required; the population of the Company's district now numbering about 80,000. The Company wished to take power to raise £200,000 further capital, by the addition of new ordinary or preference stock, which was to be ear-marked for the gas undertaking. It was proposed to consolidate all the shares, and convert them into stock bearing dividend at 5 per cent. It did not make a bit of difference to consumers of gas whether the Company paid 10 per cent. on £100, or 5 per cent. on £200. If a man went into the market now to buy any of their £10 shares, he would have to pay a very large premium indeed—probably he would have to pay £200 for £100 worth of stock. But the public did not know this; and it led to dissatisfaction, both among the people who were consuming the gas and among the employees in the works, who said: "Look at this 10 per cent.," when in point of fact no one was getting 10 per cent., except perhaps the lucky man who was able over fifty years ago to buy some of the original stock. He was going to resist as strongly as he could any attempt to put a purchase clause in the Bill; but supposing the Local Authority were authorized to purchase, this conversion, as it was not going to increase the Company's income by one farthing, would not affect the price that would have to be paid. The petition of the West Hartlepool Corporation, while complaining that the Bill proposed to increase the capital of the Company without giving any compensating advantage to the consumers, was really a petition for a purchase clause. In 1898, when the Company were last before Parliament, the West Hartlepool Corporation presented a petition in the very same words; and the matter was threshed out before Sir James Kitson's Committee, and decided against them. It was monstrous for them to come again, and try once more the very same conclusion that was decided against them only two years ago.

Tuesday, March 20.

Mr. *W. H. Fisher*, formerly President of the Hartlepool Chamber of Commerce, and now Chairman of the Company, gave evidence as to their capital powers. Although the Company had authority to issue preference stock, they had never availed themselves of the option. The greater part of the capital now applied for was wanted for carrying out extensions of gas-works authorized by the Act of 1890. By April 1 next, the whole of the share capital granted by the Acts down to 1878 would have been issued; and all the borrowing powers up to that date would have been exercised, except to the extent of £16,500—£6500 of which was allocated to the water portion of the undertaking, and £10,000 to the gas. In 1878, the make of gas was 103,788,400 cubic feet; and in 1899, it was 400,939,900 cubic feet—the increase having been continuous throughout that period, and not sudden. The plant was now worked to its utmost capacity; and as the district was rapidly developing, an extension of works was necessary. It was proposed to raise the new capital under the auction clauses, and bring the premiums into account. Hitherto, the premiums on the gas capital had been exclusive of the amount authorized; and this was the case with the water capital until the Act of 1898. The Company had only paid maximum dividends of 10 per cent. for 7 out of the 54 years they had been in existence; and of these only the last four years had been consecutive. Back-dividends had never been paid; and, so far as he knew, no claim had been made for them. Apart from the question of consolidation, the new capital was limited to a dividend of 5 per cent. They did not want to increase their borrowing powers under the existing Acts, in consequence of the conversion of the stock; and if it were necessary, they would insert words in the Bill making this clear. The present charge for gas was 2s. 4d. per 1000 cubic feet, less discounts, which reduced the actual average charge to a trifle over 2s. In Stockton, Middlesbrough, and Darlington the gas undertakings belonged to the Local Authority; but their charges were not so low as in Hartlepool. If they were merely a Gas Company, they would like to have the benefit of the sliding-scale; their difficulty in regard to adopting it, was that they were also a water undertaking.

Cross-examined by Mr. PEMBER. It would do the Company a great deal of harm if they had a purchase clause hanging over them. Since 1878, they had spent £156,000 on the gas undertaking; this amount including the premiums. If they obtained the new capital with the proposed borrowing powers, amounting together to £250,000, he calculated that it would last them for ten or twelve years.

Mr. PEMBER: I put it to you that this new capital will enable you to keep out of Parliament for a generation?

Witness: I do not think it will last more than ten or twelve years.

Mr. *Thomas Bower*, Engineer and Manager to the Company, said that the average annual increase in the demand for gas during the last two years had been 9·2 per cent. The daily capacity of the existing works was 1,847,000 cubic feet, which, deducting 10 per cent. for contingencies, meant an available make of 1,662,000 cubic feet; and this, even with the 332,000 cubic feet of water gas which they had, would leave them very much under their maximum day's consumption last winter. In 1894, they had 6982 consumers; and in 1897, 11,497—an average increase of 12·9 per cent. per annum. Since the period when his service commenced, sixteen years ago, the gas sold had increased 183 per cent., which meant an annual increase of 11·4 per cent. On the basis of this experience, in fifteen years' time the demand for gas would reach 947 millions; and to supply this extra quantity new works capable of producing 600 million cubic feet per annum would be required, which would cost £360,000 to build. On the basis of the increase in the consumption during the last two years, the new capital would only last ten or twelve years. The price of gas sixteen years ago was 2s. 6d. per 1000 cubic feet net, as against practically 2s. now.

Cross-examined by Mr. WEDDERBURN: Possibly two-thirds of the consumption came from West Hartlepool. The new capital practically doubled their gas capital. During the last three years, they had paid the maximum dividend free of income-tax. The premiums on the stock sold by auction—amounting altogether to £42,000—had been spent in enlarging the works. He did not think a purchase clause should be put into the Bill; but if it were, then West Hartlepool should only "have a say in it" to the extent of two-thirds.

Mr. *Corbet Woodall* said he had read the Bill, and approved of the conversion and consolidation of the stock. This was done first, he thought, in the case of Bristol, to avoid misapprehension on the part of workmen and the public as to the actual dividend paid to the shareholders. It was much more convenient to have one class of stock paying 5 per cent., than several stocks of different denomination. So far as he could see, the conversion of the stock could inflict no disadvantage on the public. In 1898, he predicted that the Company would require more capital owing to the rate of increase of consumption. In seven years, the consumption of gas had nearly doubled. At present the works were not sufficient for the output. Last winter all the retorts were in use. It was necessary to enable the Company to carry on their work that they should be allowed to raise £250,000 additional capital, of which £50,000 would be raised by loan. The general rule of Parliament was to give a gas company as much additional capital as would meet the requirements for twelve or fifteen years. A gas company could have no interest in procuring a larger amount of capital than their necessities required. He estimated the increased consumption of gas at 7 per cent. compound; and capitalizing this for fourteen years, at £500 per million feet, would practically absorb the whole of the proposed capital. He knew the gas-works at Hartlepool. They were carried on in an up-to-date manner, and were well managed. Even if the shares should appreciate as a result of the conversion, it would not affect the selling price of the undertaking, as an Arbitrator would base his estimate on profits, and not on the market price of the shares. He objected to an alteration of the maximum price of gas. The maximum had practically nothing to do with the price charged, as was evident by the fact that the maximum in this case was 5s. per 1000 cubic feet, while the price charged to the consumer was only a little over 2s. He saw no necessity for an additional testing-station; and he was opposed to the insertion of a clause giving the Corporation an option to purchase, because it might make the Directors always work up to the possibility of an early purchase, and it would enable the Corporation, if they desired, to seize an unfavourable moment for a compulsory sale. If the Corporation were really in earnest about

purchasing the undertaking, the best way would be for them to come to Parliament with a Bill for the purpose. In his opinion, the public would derive no advantage if the gas undertaking was in the hands of the Corporation, because the Company could raise their capital at as cheap a rate as the Corporation.

In reply to Mr. WEDDERBURN, witness said he thought it would be a mistake to reduce the maximum price of gas from 5s. to 3s. per 1000 cubic feet, as the Company might, if coal kept at a high level, have to come to Parliament to increase it again, which would be very silly. He understood such a clause as was now asked for was given in the case of the Airdrie and Coatbridge Water Bill. He did not believe the conversion would prejudice the purchase of the undertaking; but even if it did, there was no reason to object to it, as the conversion was not proposed with a view to a transfer of the undertaking. He did not consider the rate of increase which he had taken was excessive, as he believed both the consumption of gas and the population of the district would go on increasing. Even the introduction of electricity, he did not believe would materially affect the consumption of gas. It had not done so in the case of his own house. He had the electric light; but his gas bill was as large as before. If the Corporation contemplated purchase next year, he denied that there was anything in the Bill to prejudice them.

The CHAIRMAN at this stage, said what the Committee would like to know was how long the proposed capital would be likely to last without a fresh application to Parliament.

Mr. *Edmund H. Stevenson* thought Mr. Woodall's estimate of £500 per million cubic feet of increase was too low in a working-class locality, and that £650 was nearer the mark. On this basis, the capital would not last more than ten years. He also gave it as his opinion that the Bill would not prejudice the Corporation in the event of their deciding to purchase.

This closed the case for the promoters.

Mr. *Macfarlane*, Mayor of West Hartlepool, was the first witness called for the petitioners. He said at their last meeting there was a unanimous feeling on the part of the Corporation that they should have the power to purchase the undertaking of the Gas and Water Company. To allow a conversion of the stock, would, he thought, be unfair as against a possible purchaser, as it would increase the value of the shares. He was quite willing that there should be a reasonable limit fixed for the power of purchase. West Hartlepool had no objection that the other areas should join in any purchase scheme. In the interest of the future population, the Corporation felt it their duty to take this step. What he desired was that the Bill should be passed with a proviso that West Hartlepool should be entitled to come to Parliament next year with a Bill to purchase the undertaking.

Cross-examined by Mr. BALFOUR BROWNE, witness admitted that when a purchase clause was asked to be inserted in the Bill of 1898, Parliament declined to do so.

Mr. *Thomas Robinson*, Chairman of the Parliamentary Committee of the Corporation, gave corroborative evidence as to the desire to purchase. They wanted a clause inserted so as to prevent the Company opposing a Purchase Bill when brought forward next year. He was willing to give an undertaking to bring in such a Bill next year to purchase the concern on fair terms.

Mr. *W. A. Valon* considered the present demand for capital on the part of the Company was excessive. All his experience was in favour of municipalities owning gas undertakings, as it usually meant lower prices to the ratepayers.

Wednesday, March 21.

Mr. WEDDERBURN, in his address to the Committee on behalf of the Corporation of West Hartlepool, said if it was to be taken that anything done on behalf of conversion was not to prejudice the Corporation, then they would not object to the conversion of the capital. But he asked the Committee to take into consideration the amount of capital now applied for. The Company wanted £200,000 additional capital for the gas undertaking. They were really asking that their capital should be trebled. Was it reasonable that, with a population of 72,000, they should ask for such an amount? Taking the consumption per head at 4500 cubic feet, this amount of capital would enable the Company to supply a total population of about 200,000. It was altogether unreasonable. In the last ten years, the population had increased by 23,000. Was it in the least likely that, within fifteen years, the population would be 200,000? The Company were asking not to have to come again to Parliament for fifty years. He submitted that the amount of capital named in the Bill was far too large. He could not understand Mr. Woodall's objection to a reduction of the maximum charge, seeing that he said it meant nothing, as, although it was at present 5s. per 1000 cubic feet, the price of gas was only a little over 2s. With regard to the option purchase clause, the Committee would see the difficulty in which the Corporation were placed this year. At the time when the Company gave notice of their Bill, it was too late for the Corporation to come to Parliament with a Bill of their own for the purchase of the undertaking, because they would have had to consult two other districts. Mr. Balfour Browne, in his opening statement, said the Corporation raised the purchase question in 1898; and as the result of the wrestle on that occasion the Corporation were thrown. This was not the fact. The point then was that there was not the requisite authority given in favour of purchase, because it was the water undertaking, and not the gas, which it was then desired to acquire; and Mr. Balfour Browne was able successfully to contend that the Corporation were not in a position to ask for purchase. This being so, they had suggested that the Committee should give them the Airdrie and Coatbridge clause; but the main point he desired to make was that nothing which occurred this year should prejudice them in the application which the Corporation undertook to make next year—the application which would be involved in bringing in a Bill for purchase. While he, as Counsel for the Corporation, gave an undertaking that they would come forward next year with a proposal to purchase either as much of the undertaking as was in West Hartlepool or the whole jointly, he asked that, of the additional capital which the Committee might empower the promoters of the present Bill to raise, no portion should be issued until the Corporation had come to Parliament with their Bill, so that every matter might be left over.

Mr. BAGGALLAY: I shall certainly not give any such undertaking.

Mr. WEDDERBURN said it would not prejudice the Company if such an undertaking were given; and the refusal to give it showed that the object was to appreciate the price at which the Corporation would have to purchase. The only excuse the Company could have for raising additional capital at once would be that they urgently wanted more works for the supply of gas. This was not so, because their own evidence showed that the works were equal to the present supply. The Company's Manager, in his examination-in-chief, was asked: "Are the works equal to the strain put upon them for the supply of gas at present?" His answer was: "They are." Even assuming there was a slight increase—an increase, say, of 9 or 10 per cent.—they still had ample works, because Mr. Bower said that last year water-gas plant had been laid down which would enable them to produce a million cubic feet per day. Thus it was perfectly clear, from the evidence of their own Manager, that the Company had got all they wanted for the moment, and from the other evidence that they still had a margin. The Company did not require any additional capital this year. He asked therefore that the matter should be left entirely open until the Corporation came forward to purchase. Nothing could be fairer; anything else would be most unfair. It had been impossible for the Corporation to produce this year a substantive Bill; therefore let them play the game fairly. Let nothing be done which would enable the Company to say that the Committee had gone into the matter and decided in any sense against the Corporation. Although raising additional capital would not prejudice the Corporation in any application they might make next year, it might possibly prejudice them in regard to price.

Sir CAMERON GULL: You are not asking us to give you the Airdrie and Coatbridge precedent.

Mr. WEDDERBURN: I am not going so far as that. I do not ask the Committee to refuse such additional capital as they think fit; but I ask that we shall not be prejudiced. Let it be understood that the whole matter is left over till next year.

Sir CAMERON GULL: In the Airdrie and Coatbridge clause, there was no restriction to the Company raising the capital authorized and going on with their works.

Mr. WEDDERBURN held that his suggestion was something less than was embodied in the Airdrie and Coatbridge clause. If, on the other hand, the Committee thought that what was given in that clause was less than he had asked, he should be content with the clause. The principle remained the same. If it were laid down, as in the Airdrie and Coatbridge clause, that next year the Company should only oppose the Corporation on matters of detail, he would be content.

Mr. BAGGALLAY: May I, before addressing you, Sir, ask whether the point as to anything in the nature of reconstruction and of raising or spending capital not taking place until the Corporation bring forward a Bill has been decided against my learned friend. Otherwise I should like to say a word about that.

The CHAIRMAN: I think the Committee would be against him on that point, and that you had better go on.

Mr. ORR-EWING: Do you agree to the proposal to insert a clause giving the Corporation power to purchase?

Mr. BAGGALLAY said he did not assent to that at all. It was assumed at once that such an instruction was meant to have some effect. Every word put into an Act of Parliament was interpreted as being intended to have some operation; and if there was none apparent on the face of it, they had to find out some meaning to attach to it. Directly they put in words of this sort, the Arbitrator would have to ask himself why they were there. Such words, being harmful and useless, would lead to litigation. The process in a case of purchase was this. The value on the market on the amount of capital had nothing to do with the matter. What a gas or a water undertaking was worth was what it would bring in per annum. It was its maintainable revenue, which was to be multiplied by a certain number of years' purchase, ascertained by having regard to the security of the revenue. The only other point was the question of capital. With a dexterity which did his learned friend credit, he said the amount of the gas capital was now only £125,000. His learned friend had evidently not read the accounts. On June 30, 1899, the amount of capital expended for gas purposes exceeded £245,000. This was a remarkable discrepancy. Under the Act of 1878, the £100,000 of capital authorized realized when sold by auction £160,000; but £60,000 did not carry dividend. Then the borrowing powers had not been taken into consideration.

Mr. WEDDERBURN remarked that his learned friend had not appreciated his point. The sum named had kept the Company out of Parliament for twenty years.

Mr. BAGGALLAY said his learned friend forgot the £60,000 of premiums and £25,000 borrowing powers, of which £10,000 had been raised. In addition, at the commencement of 1878 the Company had £60,000 which was not spent; so that they had had £235,000 to use for gas purposes since 1878. In that year, they had works above the requirements. The total amount of capital now was £250,000; but this included all premiums. By every penny that the premium was increased, so was the amount of dividend paid reduced. The Company, therefore, had no inducement to spend a penny more than was requisite. Under these circumstances, he submitted that no alteration should be made in the amount of capital which was proposed. The question was as to the sufficiency of the capital. On this point, they had the evidence of Mr. Woodall, Mr. Stevenson, and Mr. Bower. These gentlemen knew the works; and they told the Committee that in twelve years the whole of the capital would be absorbed. The only evidence against this was that of Mr. Valon, who had never seen the works. Mr. Valon, to overcome the evidence of the three gentlemen named, said he generally took 5 per cent. at compound interest as the rate for the increase of consumption; and this would mean that the capital asked for would last over twenty years. But Mr. Bower showed that between 1883 and 1889 there was an increase of 83 per cent. in consumption, or 11·4 per cent. per annum. Taking this as the basis of increased consumption for the next fifteen years, he said the demand for gas would then reach 947 million cubic feet. To supply this extra quantity, additional works capable of producing 600 millions per annum would be required; and the cost of putting up such works would be £360,000, on the basis of £600 per million cubic feet. Mr. Valon in his figures did not take into consideration anything for working capital. The view expressed by Mr. Woodall in regard to the amount of capital asked for, was fully confirmed

by Mr. Stevenson. He submitted that the amount of capital asked for was reasonable, and ought not to be altered. The Company might have to come to Parliament again for capital for the water undertaking.

Mr. PEMBER: But that is not gas.

Mr. BAGGALLAY: Whether we come for water or for gas, makes no difference. The Corporation always raise the same point. They seem to have a stereotyped petition for the purpose. In 1898, when the Company were in Parliament for water, gas was raised; and now we are here for gas, water is raised.

Sir CAMERON GULL said Mr. Woodall estimated that £150,000 would be sufficient capital for ten years.

Mr. BAGGALLAY: Of course, less capital would be required for a smaller number of years.

Sir CAMERON GULL noticed that Mr. Stevenson at once altered the basis of calculation; and, of course, the result came out differently.

Mr. BAGGALLAY did not think he could add anything more.

The CHAIRMAN said the Committee would like to hear something about the income-tax.

Mr. BAGGALLAY did not know what amount had been so expended.

The CHAIRMAN: But you do not intend to make this illegal expenditure in future.

Mr. BAGGALLAY held that the Company were entitled to pay this so long as their back-dividends did not reach the maximum of 10 per cent.; but if they paid it after all the dividends had reached the maximum, then it would be illegal.

Mr. PEMBER thought there ought to be some means of seeing that the money paid for income-tax came off back-dividends.

Mr. BAGGALLAY said that, with regard to his statement of the law as to how far the payments were illegal and irregular, Mr. Pember admitted that he had fairly put the case. With regard to the amount—altogether about £2700—which had been paid irregularly, the Company had no objection, if the Committee thought fit, to make it appear in future accounts as applied towards the redemption of the amount due in respect of back-dividends. This would be perfectly right and legal. It was purely a matter of accounting.

The CHAIRMAN: Subject to your cutting down the capital from £200,000 to £150,000, with the usual borrowing powers, we shall declare the preamble of the Bill proved.

HOUSE OF COMMONS COMMITTEE.

Thursday, March 15.

(*Before Mr.* SCHWANN, *Chairman, Commander* BETHELL, *Mr.* DOOGAN, *Mr.* MOON, *and Mr.* BONHAM CARTER, *Referee.*)

BRIGHTON CORPORATION BILL.

This Bill, which provides *inter alia* for the construction of tramways entirely in the town of Brighton, the acquisition of land for purposes connected therewith, at a cost of £200,000, and the erection of a generating station at Southwick, three or four miles outside the town, at a cost of £400,000, including purchase of land, was considered to-day.

Mr. PEMBER, Q.C., who opened the case for the Bill, said the Corporation had gone thoroughly into the question of the system of electricity to be used; and after visiting a number of towns to examine their methods of electric traction, decided to adopt the overhead-trolley system. Dealing with the petition in opposition of the Brighton and Hove General Gas Company, he said they alleged that by the use of electric power for working the tramways, very serious damage would be caused to the Company's gas mains and services lying under the roads along which the tramways are to run. In the event of an escape of electric current, these mains and services would be damaged and destroyed, the Company would suffer by the escape of gas, and grave danger of personal injury to the public and to property would ensue. The Company also alleged that damage might be occasioned to their mains and services from vibration caused by the working of the tramways, which would cause leakage of gas from the joints of the mains and services, and bring about grave danger of explosion. They opposed the power that was sought by the Corporation (as they alleged, in clause 40) to alter the position of their pipes without notice to the Company; holding that it must cause great inconvenience to the Company and to consumers. Clause 40 was, however, Counsel pointed out, the ordinary clause. If it was absolutely necessary to give special protection, the Committee would doubtless consider the point with regard to the Company's earlier allegations. What was true of Brighton must be true of every town or road in which gas-pipes were laid; and unless the Committee were going to say gas-pipes and electric wires could not lie in the same street—and he did not think they were, having regard to what had been done in London and every other town where electricity was consumed—he saw nothing special in this case. The Electric and Gas Acts contained clauses in which the utmost care had been taken that nothing whatever should be done which could possibly lead to the terrible consequences suggested. This must be a matter of clauses; but he pointed out that the General Acts required abundance of precautions to be taken to prevent either electrolysis or fusion. Moreover, clause 27 of the Bill provided ample protection—being the Model Clause which was based on the report of the Committee of both Houses of Parliament upon electric traction. This was found sufficient all over the kingdom; and he did not know what more the Gas Company could want. The wires, he added, were to be laid in earthenware pipes; so that all chance of danger, if not absolutely removed, would be minimized to an extraordinary degree.

Mr. *J. E. Stafford*, Mayor of Brighton, gave evidence generally supporting the scheme.

Mr. LITTLER, Q.C. (who, with Mr. DU CANE, appeared for the Brighton and Hove General Gas Company), suggested, in cross-examination, that the position of the Corporation's existing electric mains in relation to the gas-mains had not been very satisfactory to the Company. Witness thought there had been complaints on both sides, but was unable to say the Corporation had always denied liability. With their existing electric power, the Corporation could not work the tramways.

Mr. *Joseph Kincaid*, of Messrs. Kincaid, Waller, and Manville, said he, in conjunction with the Borough Engineer of Brighton, laid out the tramway scheme, which he described in detail. With reference to the allegation of the Gas Company that their property would be injured by vibration, he said he had constructed many miles of tramway over the mains of gas and water companies, with the consent and approval of the engineers of the companies; and there had been no complaints. As to working electric tramways over mains, he laid, in Bristol, an electric tramway over a main for nearly 2 miles; and the Engineer told him recently that there had been no bad effect. Clause 27 of the Bill, which embodied the regulations of the Board of Trade for the protection of gas-mains and other similar things, was the Model Clause for Bills of this kind.

On Friday, the Committee were engaged considering the portion of the tramway scheme affecting Dyke Road, which was warmly opposed by a number of frontagers; and this part of the case was still being heard when the Committee adjourned.

Tuesday, March 20.

On Monday and this morning the Committee were engaged with the tramway part of the scheme. This afternoon,

Mr. LITTLER informed the Committee, with regard to the important points raised by the Brighton and Hove Gas Company in opposition—one being as to an enormous electrical main running along a private road, and another as to the groining of the Company's works—the Corporation had seen their way to concede what the Company thought to be fair and reasonable terms, and clauses would be brought up at a later stage to carry out the agreement. He rather regretted, in one sense, that the agreement was arrived at, because otherwise the Committee might have had some interesting details as to electrical fusion.

Mr. PEMBER acquiesced in Mr. Littler's statement that the opposition had been withdrawn, and that the clauses would be brought up.

Thursday, March 22.

The electrical portion of the Bill having been considered on Wednesday, the case with reference to the increase of the water supply of Brighton was taken to-day.

Mr. PEMBER stated that Hove had always been supplied with water by Brighton; and the present proposal was to raise £350,000, in order to carry out works which would increase the supply (as it was estimated) to 9,800,000 gallons a day; the maximum day's demand hitherto having been 7,600,000 gallons. This increase was regarded as sufficient for the requirements of the whole area for the next twenty years. The only opposition was that of the Hove Corporation, who stated that Brighton made a large profit out of the water charges, which they devoted to the reduction of the Brighton general rates, instead of, as Hove contended should be the case, to the reduction of the water charges over the whole area of supply.

Eventually the Committee decided against the contention of Hove, and passed the preamble of the Bill relating to water.

Consideration of the clauses was then proceeded with. Clause 40 gives power to the Corporation to alter the position, *inter alia*, of gas-pipes laid in the streets—causing as little detriment and inconvenience as circumstances admit, and making full compensation for all damage. This was a clause objected to by the Gas Company. The following are the additions to this clause on which the opposition of the Gas Company was withdrawn:—

2.—Before the Corporation alter the position of any such main or other pipe or apparatus laid down or used by any such Company, they shall (except in cases of emergency) deliver to the Company to whom the same belongs a detailed description of the alteration proposed to be made, together with notice specifying the time at which they will begin to make such alteration; such particulars and notice to be given seven days at least before the commencement of the work for effecting such alteration. If it should appear to such Company that such works would interfere with, or impede, the supply of gas, such Company may, on giving notice to the Corporation to that effect by their own Engineer or workmen, do and execute such works; and the Corporation shall, on the completion thereof, pay to the Company the reasonable expenses incurred by them in the execution thereof.

3.—In the event of the works described in such notice to the Company not being objected to, the same shall be executed in accordance therewith by the Corporation under the superintendence of the Company to whom such pipe belongs, unless such Company refuses or neglects to give such superintendence at the time specified in the notice for the commencement of such work, or discontinues the same during the execution of such work; and the Corporation shall execute such work to the reasonable satisfaction of the Engineer of such Company.

4.—If any difference arise between the Corporation or the Borough Engineer and any such Company or their Engineer touching the amount of any costs, expenses, or charges under the provisions of this section to be paid by the Corporation to any such Company, or touching any work, matter, or thing with reference to such mains, pipes, or apparatus under such provisions to be done or executed by the Corporation, or the mode of doing or executing the same, such difference shall be settled by an Engineer to be agreed upon by the Borough Engineer and such Company respectively, or, failing agreement, by such Engineer as shall, on the application of the Borough Engineer or such Company, be named by the President of the Institution of Civil Engineers.

The following was also accepted (being part of the compromise with the Gas Company) as an addition to clause 51, under which works below high-water mark are not to be commenced without the consent of the Board of Trade:—

Twenty-one days' notice in writing of any application to the Board of Trade for their consent to the construction of any groyne or other protective work proposed to be constructed by the Corporation under the powers of this Act on the sea beach or foreshore and bed of the sea adjacent to the lands described in the schedule to this Act, shall be served, together with plans and sections of the intended works, on the Brighton and Hove General Gas Company by the Corporation.

The first volume of the minutes of evidence taken by the Royal Commission on the Metropolitan Water Supply has been published. It consists of 686 pages, and includes the proceedings down to the close of the 31st day of the inquiry (July 25, 1898), when the Commissioners adjourned till the following November.

HOUSE OF COMMONS COMMITTEE.

Monday, March 19.

(*Before Sir* SAMUEL HOARE, *Chairman, Mr.* ASHTON, *Mr.* SOAMES, *and Mr.* DRAGE.)

LONDON COUNTY TRAMWAYS (No. 2) BILL.—THE RIGHTS OF GAS AND WATER COMPANIES.

This is a Bill to empower the Council to employ electricity as a means of traction on the tramways which they now control, or may hereafter control. At present there are 115 miles of tramway laid in London, 72 miles of which have been purchased by the Council; and the Council, by another Bill they are promoting in the present session, propose to make branches linking up various lines in the northern district. The cost has been £1,704,000. By the end of 1903, additional tramways (30 miles in extent) will fall into the hands of the Council. The whole of the northern section (48 miles in extent) is at present leased to the North Metropolitan Company, whose lease terminates in 1910. By the present Bill, the Council seek powers to work the tramways electrically by the best plan. They propose to adopt either the conduit or the surface-contact system; but they retain the right to use the overhead system, should they find it desirable, in suburban districts. They provide, however, that they shall not adopt the overhead system without the consent of the Local Authorities. From the experience of electric traction in Glasgow, the Council anticipate an extra profit of 3·38d. per car-mile, which, on the mileage travelled, would amount to £140,000. The cost of equipping this portion electrically would be £850,000; so that, after allowing 7 per cent. for interest and sinking fund, a surplus of £81,000 would remain. Dr. Kennedy has reported on the question, and has decided, from his experience on the Continent and in the United States, that there is no difficulty in working tramways electrically in London, and that an underground system could be found which was both effective and fairly cheap. The Council are about to lay an experimental line between Westminster Bridge and Tooting, half of which will be on the conduit and half on the surface-contact system. By one or other method, Dr. Kennedy hopes to devise a scheme to work the tramways effectually and economically.

Mr. POPE, Q.C., Mr. FREEMAN, Q.C., and Mr. DU CANE appeared for the London County Council; Mr. CASTLE, Q.C., for the South Metropolitan Gas Company; Mr. CLAUDE BAGGALLAY, Q.C., for the Lambeth Water-Works Company; Mr. READER HARRIS, Q.C., for the East London Railway Company; Mr. ERSKINE POLLOCK, Q.C., for the Vestry of Hackney; Mr. PEMBROKE STEPHENS, Q.C., and Mr. VESEY KNOX, for the Wandsworth Board of Works; Mr. VESEY KNOX, for the Vestry of Battersea; and Mr. F. DODD, for the Vestry of St. Saviour's, Southwark.

Mr. *J. W. Benn*, the Chairman of the Highways Committee of the Council, Dr. *Kennedy*, and Sir *Alexander Binnie*, the Chief Engineer, to-day gave details as to the scheme.

Tuesday, March 20.

Dr. *Kennedy* was this morning cross-examined at some length by Mr. CASTLE, as to damage that might occur to the mains and pipes of the Gas and Water Companies through the leakage of the electric current. The Council had reserved the power to adopt the overhead system; but the best method was, in his opinion, the conduit system with the insulated return. This system had insulated conductors throughout, and did not use the rails or earth as a return. The possibility of electrolysis due to leakage currents was thus obviated. There was undoubtedly a chance of electrolysis due to leakage occurring from an uninsulated return. The Board of Trade regulations, however, instructed that the leakage should be found out; and he (Dr. Kennedy) believed there was not a record of a tramway working under these regulations where electrolysis had been discovered. Every line in the country was working with an earth return under these regulations. There was no case with an insulated return.

By the COMMITTEE: If these really were serious currents in the earth, it would be a dangerous matter. It had been found in America, where the leakages were very great, to be most serious.

Witness (continuing) said, in his view, there was no difficulty in preventing any such currents, or in discovering the leakage. Under existing regulations, no case of electrolysis had, to his knowledge, taken place.

Sir *A. Binnie*, in cross-examination, said all the alterations of mains and pipes had been made by the workmen of the several Companies. There had been a serious accident at Manchester, in which the Engineer was killed. This had called the attention of the gas companies to the danger; but he thought the insertion of a clause that any alteration in the mains should be made by the Company, if they so desired, would take away the controlling power of the Council as to the way in which the work should be performed.

Replying to the COMMITTEE, witness said the alteration of the tramways would not interfere with the water-pipes at all; but it would with the gas-pipes.

At the conclusion of the promoters' case, the opposition of the East London Railway Company was considered.

Mr. CASTLE then addressed the Committee on behalf of the South Metropolitan Gas Company. He said there were two points which raised very important questions. The County Council were seeking to introduce, to an unprecedented extent, electricity as a motive power; and one of the effects of this, unless the current was under perfect control, was that there was a possibility of escape which might produce a vast amount of damage to underground pipes and mains. They had not had in this country, up to the present time, sufficient experience of what electricity could and might do with regard to electrolysis, as a means of eating and wearing into iron pipes below the surface of the ground; but great mischief had admittedly been done in the United States. There was the possibility that similar results might occur in London; and the Company had, therefore, come to ask from Parliament that protection to their mains to which they were entitled. If the Council were right, that the regulations of the Board of Trade would prevent injury to the mains, then a protection clause would be inoperative. But if, on the other hand, leakage occurred, and harm was done, they would obtain compensation from those who should give the compensation, without having to consider whether it was the fault of the Board of Trade in not having made proper regulations, or the fault of the Council in not having followed the regulations. The Board of Trade, he was informed, had not carried out the recommendation of the report of 1898, which advised that there should be a clause inserted giving them full power of supervision and control. No such clause was in the present regulations, which were not of 1898, but of 1894. The Company did not wish to bring in the question of the Board of Trade. They said: "You are introducing, for your purposes, an unreasonable amount of electricity. If that electricity escapes and does us damage, let us be compensated." This protection was necessary for the public, as well as for the Company. He asked, therefore, that the Council should insert a clause in their Bill to give the Company full compensation for any injury to their pipes or mains by electrolytic action. Then as to the second point, the Company wished to have confirmed by Parliament what was admittedly the practice—that they should be entitled to do the work which the Council required done in connection with their mains. The interference of the Council's men would be a positive danger to the public; and so the Company asked for a clause to protect them from such a contingency.

Mr. *C. C. Carpenter*, Chief Engineer of the South Metropolitan Gas Company, was called in support of the claim. He said the Company's area of supply was 50 or 60 square miles. He had seen the clause giving the Council power to alter their pipes and mains. If this work were carried out by the Council, he should decline the responsibility of supervising it. Even with experts, the operation was dangerous. Such work had invariably been done by the Company themselves. Since the Tramways Act of 1870, there had not been a case in which a Tramway Company or the Council had ever attempted to alter the pipes. Indeed, he was ignorant that they had any powers under their Acts to do so. The Company had been so impressed with the danger, that they had opposed all Bills in Parliament this session which contained a clause to that effect. This was the first time the matter had come before Parliament. The work of altering mains and services required to be done by trained men, and under expert supervision. This question of electrolysis had been brought under his notice by experience abroad—particularly in America. Other corporations were now considering the question. It was not that the regulations were ineffective, but that there had not been sufficient opportunity of testing them.

By the COMMITTEE: He did not know any case where a clause had been given to a gas or water company with reference to damage by fusion. He only knew that damage had arisen.

Mr. BAGGALLAY, for the Lambeth Water Company, said the question taken up was in the nature of a test case. Through the Lambeth Company, the London Companies were acting in concert. There were two questions; and they were both very important. One was whether there should be a liability on the part of the London County Council to pay compensation in the event of damage being done; and the other, whether the work which had to be done in the way of altering the mains of statutory bodies having statutory obligations to the public should be done by the bodies who were responsible or by some foreign body. The County Council and the Local Authorities had no power at present to interfere with the pipes or mains of either of the Companies. If they obtained any authority in the future, it would be simply the power conferred upon them by the Act which they (the Committee) sanctioned.

Mr. FREEMAN: Under the Tramways Act, they have power.

Mr. BAGGALLAY said Parliament only gave the power under the Tramways Act by passing the Special Bill which made it applicable; but until the Bill passed, neither County Council nor Vestry had power to touch any mains or pipes. The first point he would deal with was whether they should or should not have a compensation clause. Mr. Benn had said if they were not protected they should be; and he (Mr. Benn) said he had been advised that the clauses of the Bill with regard to electrolysis and fusion sufficiently protected the Company. This question could only be determined by the test of experience; and that experience they had not now. The question then came to this: Are the regulations which have been already made, or which can hereafter be made, sufficient protection? This was the whole point in determining whether they should have a compensation clause. If the regulations were sufficient, and they were complied with by those working the trams, then under the clause the Council would incur no liability to pay compensation. Then if they assumed that the regulations were sufficient, and were not complied with, the Companies would have the right to compensation under the general law. But, in the third contingency, where the regulations were insufficient though properly complied with, a compensation clause was absolutely necessary to do justice to the parties injured. If the Council complied with the regulations, they would be protected by their clause, and no action would lie. This was the case they wished to urge—the contingency of the regulations proving insufficient. They had been, he believed, framed as well as they could be; but admittedly they could not meet all cases. The learned Counsel quoted the evidence of Sir W. Preece before the Joint Committee, in 1898, and the report of the Committee, which said: "The clauses which protect gas and water pipes have worked satisfactorily, and should be continued; but the Committee would direct attention to the observations of Mr. (now Sir W.) Preece, as regards the difficulty arising from the working of tramways by trolley wires. His suggestion as to a strong control clause should be carefully considered." Nothing, however, had been done to alter the regulations then existing; so that there were still contingencies. The Companies did not know what their risk might be; they did not even know what system the Council would adopt. The Council were still experimenting; and Parliament should in equity take care that if the Companies were damaged by their action, provision should be made for compensation. The learned Counsel then dealt at some length with the question of the alteration of pipes; urging that the fact that the Local Authority always asked the Companies to move their own mains, was the strongest evidence of the necessity of their clause. Considering their obligations to the public, it was only right the Companies should have the protection they asked.

Replying to a question from the Chairman, Mr. BAGGALLAY said he could not at the moment give the Committee any precedent for the introduction in a Tramway Bill of a clause such as he desired. This was, he believed, the first time it had been asked for. Anyhow, it was the first time electric traction had been introduced into London.

Mr. *James Swinburne* said he had gone into the question of the damage that was likely to arise to gas and water mains from electric tramways

being carried over them. In little towns the Board of Trade regulations —which were intended to deal with small systems—would, he thought, protect gas and water pipes sufficiently; but in a large system like that proposed in the present Bill, there was no saying how far the pipes might be attacked. They certainly would be attacked to some extent. It was a matter of degree; but as the attack was a very insidious one, it was very difficult to tell how much damage could be done before it was found out. The damage was spread over the whole system. One could not find out anything, until suddenly a pipe went somewhere; and then all the pipes might be discovered to be bad. Insulated returns would practically get over the difficulty; but by any other method, the pipes would be liable to danger.

Mr. BAGGALLAY: Is there any machinery provided by the regulations of the Board of Trade which would ensure discovery of electrolytic action.

Witness: No; there is none known yet. You cannot tell whether there is any electrolytic action until you find it has taken place.

Until the mischief is done?—Yes; practically.

Is it silent and secret?—Yes.

And continuous?—Yes; because it is obvious you cannot go and bore holes all over towns, and connect little pivot wires with your mains, to know what is happening. I am dealing with practical methods.

Then if Dr. Kennedy said that there was machinery in the regulations for discovering the action of electrolysis at once, you differ from him?—I respectfully differ. I mean Professor Kennedy is a great authority.

In cross-examination by Mr. DU CANE, witness said he could not agree that for all practical purposes the Board of Trade regulations would prevent electrolytic action. The regulations were aimed to make the action as small as possible; that was all he could say. He did not maintain that they were perfect. Personally he did not know of any case of electrolytic action where a tramway was working under the Board of Trade regulations.

In re-examination, witness said the regulations had been in operation since 1894. Electric tramways had been of very gradual growth; but they were going ahead tremendously now. They had a very small and limited experience of the effect of electricity; and he thought the Companies were, therefore, entitled to be protected if electrolysis set in.

By the CHAIRMAN: The ordinary wear and tear of pipes was nothing to what would be due to electrolysis. He could not give cases where he had seen damage done. In fact, the damage done by existing tramways would not be known yet.

By the COMMITTEE: There were no means of finding a leakage of current that left the rail, went to a pipe, and then returned to the rail. The only way would be to see the injury done to the rail itself. This was to some extent a safeguard.

Wednesday, March 21.

Mr. VESEY KNOX to-day addressed the Committee on behalf of the Battersea Vestry; and Mr. PEMBROKE STEPHENS followed for the Wandsworth Board of Works.

Dr. *Kennedy*, re-called by the Chairman, said he estimated the cost of the electrical equipment of the London tramways would be £14,450 per mile of single track. This included the whole cost of lines, rolling stock, and generating station. The total length of tramways was equal to 207 miles of single track. The sum he named was for the conversion of the lines. At present only 72 miles had been purchased, which had cost £1,704,000.

Thursday, March 22.

Mr. *H. E. Haward*, the Comptroller of the County Council, was examined as to the financial arrangements of that body. Their loans were borrowed with the approval of the Treasury, and were sanctioned by Parliament in their annual Money Bill.

Mr. POPE then replied on some points of the case suggested by the Chairman. As to the Gas and Water Companies, they claimed that the Council should guarantee that no injury should be done by the trams to their pipes and mains. Other causes than electrolysis affected the life of the pipes; and the Companies had no monopoly of the road, but where only entitled to a user. He agreed that the Council would be liable if they did not take the best means of preventing damage; but what was asked was that the users of electricity should be liable to damages whether they employed the best methods or not. This liability did not exist. Ought it to exist? They were willing to come under the liability if they did not obey the regulations; but they should not be asked to do more. It was admitted that there was no risk of electrolytic action if the conduit system with an insulated return was adopted. There might be some danger in the surface-contact system; but Mr. Swinburne had agreed that he had never known of injury where the Board of Trade regulations had been carried out. The learned Counsel asked the Committee to remember that all the Bill proposed to do was to change the mode of traction.

The CHAIRMAN, after a short consultation with the Committee, said: The Committee wish me to make a few remarks with reference to our decision, as the matter is one of considerable importance. By this Bill, the London County Council apply for authority to use electric power for traction on their tramways. As the estimated amount of the expenditure contemplated by the Bill is £3,000,000, the proposal is by far the largest and most important of its kind which has yet been before this House. The petitioners against the Bill are the Vestry of Battersea, the Wandsworth District Board of Works, the Vestries of Hackney and Southwark on clauses, the East London Railway Company, the Lambeth Water Company, and the South Metropolitan Gas Company. Of the forty Vestries whose districts are represented on the London County Council, all have agreed to the provisions of the Bill, with the exception of Hackney, Wandsworth, Battersea, and, possibly, on clauses Southwark. The Committee are satisfied that if London is to have the full advantage of electric tramways, it will not be desirable that special provisions should be introduced into the Bill for the protection of the three Vestries which have petitioned. The Committee are influenced in this decision by the fact that Hackney has six members, Wandsworth two, and Battersea two on the County Council; so that if any grievance arises in their districts, they have equal opportunity with other districts represented on the County Council of bringing that grievance forward before the County Council. In reference to the petitions of the Gas and Water Companies, no evidence has been placed before the Committee as to any cases of loss in this country sustained by fusion of, or electrical action on, gas and water pipes. The Committee are satisfied that the provisions of the present Bill and the enactments of the Tramways Act, 1890, with the fact that the London County Council are subject to the Board of Trade, both as to the approval of their system of traction, and as to regulations that may from time to time be laid down, make every reasonable provision to meet the contention of the two Companies. The Committee, with these remarks, find the preamble of the Bill proved.

The Committee then proceeded to consider the various clauses of the Bill.

HOUSE OF COMMONS COMMITTEE.

Wednesday, March 21.

(*Before Sir* T. GIBSON-CARMICHAEL, *Chairman, Sir* CAMERON GULL, *Mr.* F. J. HORNIMAN, *and Mr.* ORR-EWING.)

SOUTHPORT WATER BILL.

This was a Bill having for its object the granting of further powers to the Southport Water-Works Company. It included the construction of a new service tank at Aughton, with a high-level pumping-station, and the raising of £60,000 of additional capital. The petitioners against the Bill were the Corporation of Southport, the Southport and District Property Owners' Association, the Rural District Council of West Lancashire, and the Urban District Council of Birkdale.

Mr. BALFOUR BROWNE, in opening the case for the promoters, said the works proposed would be subsidiary to, and in connection with, existing works, with a view to giving a better pressure of water to some of the districts supplied. The additional capital of £60,000 would be raised by the creation and issue of new shares. This was a perfectly legitimate extension of existing works and extension of capital; and why anybody should object to this, it was difficult to see. As to the opposition of the Southport Corporation, this body wanted a clause by which the Company should be compelled to sell, and the Corporation should have the power of purchase. This was an absolutely unprecedented proposal in the case of a Water Company. It was alleged that the Bill was promoted for speculative purposes and not in the interest of the ratepayers; but he really did not know what this meant. This was a genuine promotion, and not a speculative one. As to the petition of the Urban District Council of Birkdale, it alleged that the inhabitants of the Birkdale district would be injuriously affected by the provisions of the Bill. It was submitted that provision should be made in the Bill for restricting the amount of capital authorized to the sum likely to be required in the near future; and that the proposed power to convert the loan capital into share capital should be omitted. But the most important paragraph in the petition was that which complained of the quality of the water supplied by the Company—particularly in regard to its hardness; and it was suggested that the Company should be required to take proper steps to efficiently soften the water before it was supplied for consumption.

Counsel for the Birkdale Corporation said that the part of the petition which related to the hardness of the water would not be pressed.

Mr. BALFOUR BROWNE added that another proposal of the petitioners was that provisions should be inserted in the Bill requiring the Company to sell to the petitioners so much of the undertaking as related to their district, upon terms and conditions which, while not inflicting any hardship or loss upon the shareholders of the Company, would not impose an undue burden upon the ratepayers of the district.

Mr. *Henry Rofe*, General Manager of the Company, said it was the West Lancashire Rural District Council who complained of the ineffective pressure; but the contemplated works would make the distribution more effective than at present. The Company had always been able to assure a supply day and night; and the proposed duplicate plant was to enable them to meet requirements up to the total possible amount. He calculated that the additional capital would last for eight or ten years to come. The cost of softening the water would be very great. He did not know any single company or corporate water undertaking as efficiently conducted as the Southport Water-Works.

In cross-examination by Mr. FREEMAN, witness said that, in his opinion, increased storage was necessary.

Thursday, March 22.

Mr. HONORATUS LLOYD pointed out that in one or two of the petitions certain allegations of discourtesy on the part of the Company's officials were made. He desired to know if these charges would be pressed, because, if so, it would be necessary to call the officials against whom the charges were made.

No reply was made by Counsel for the petitioners.

Mr. *Joseph Holland* was called by Mr. LLOYD THOMPSON, and said he had heard of no complaints from consumers, either in regard to himself or other officials of the Company.

It was here stated by Counsel for the petitioners that they did not intend to further pursue this portion of the case against the Bill.

Mr. *Peter Balmer*, a property owner in the neighbourhood of Aughton, and Vice-Chairman of the Aughton Parish Council, said the opposition of the West Lancashire Rural District Council came as a surprise to many members of the Aughton Parish Council. Aughton had been well served by the Company, who had practically made the place since 1872. There was great need at present of increased pressure.

Mr. *Charles Hawksley* described the proposed extension of the works at Aughton, which he said would, when carried out, enable the Company to give a proper supply of water to every consumer in the area. The amount of capital sought to be raised was £60,000 in shares, and £15,000 by way of loan. The Company's mains must be extended in the near future, if they were to fulfil the obligations placed upon them by Parliament. So far the Company had performed their duties with satisfaction. They would, however, have to come to Parliament again in seven or eight years, as new mains would be necessary. The estimated cost of the proposed works was £28,400—for the tower and tank £4000, and for the other portions £24,400.

Mr. *C. M. Eaton*, said the Company's charges were slightly above the

average; but they had, by concessions voluntarily made by the Company, been brought down to or below the average—at least for houses under £8 in value. He considered that the regulations of the Company were both reasonable and proper. It might be contended by the Southport Corporation that the proposed new works were unnecessary; but it would be unreasonable to reject the Company's Bill on that account, because the price of the undertaking would not be affected in the event of the Corporation obtaining compulsory purchasing powers.

This closed the case for the Bill.

Mr. WORSLEY TAYLOR, in opening for the petition of the West Lancashire Rural District Council against the Bill, said no charge of misconduct was made against the Company. He, however, contended that the policy of Parliament was to give to local authorities the power to supply water; and many companies had agreed to transfer their undertakings, because they feared if they refused to do so Parliament would order the transfer. If the supply were left in the hands of companies, the user of the water would be stinted and restricted; whereas local authorities having charge of the supply would encourage all proper use of the water, in order to improve the sanitary condition of their districts. No suggestion had been made in the present case that the transfer would lead to hardship; and the common-sense view of the matter was not to adopt such a course as would necessitate litigation next year.

Mr. *A. Dickinson*, Clerk to the Council, in reply to Mr. VESEY KNOX, said that, for a few years at any rate, none of the proposed works were of an essential character. The Council he represented considered it was beneficial to the public at large that water undertakings should be controlled by the local authority. His Council had an agreement with the promoters by which the water-rate could not exceed the amount at present charged.

In answer to Mr. LLOYD, witness said the Company had behaved admirably towards his district, and he had no fault whatever to find with them.

Mr. HORRIDGE, on behalf of the Birkdale Urban District Council, said although Southport and Birkdale were fighting each other last week in regard to the question of the gas supply, Birkdale desired to support the Corporation of Southport in every way they could in the taking over by a Joint Board of the water undertaking. They had agreed to the promotion of a Bill next session to constitute such a Board - power being reserved to the Birkdale Council to purchase their portion of the works if they so desired.

Alderman *Griffith*, Mayor of Southport, examined by Mr. POPE, said Southport was practically unanimous in favour of the acquisition of the water undertaking. The Corporation had been contemplating purchase since 1867.

The Committee having deliberated in private,

The CHAIRMAN said: Subject to certain provisions, we find the preamble of the Bill proved. First, the capital to be reduced to £40,000, and the usual borrowing powers; secondly, the money borrowed, as well as the new shares, to be subject to the auction clauses; and, lastly, a clause to be inserted providing that the powers bestowed by this Bill shall not enhance the value of the undertaking in the event of purchase under a Bill next session by the combined Local Authorities, except so far as the money that may have been actually spent on works at the time of the purchase.

Mr. BALFOUR BROWNE said the promoters would bring up a clause next morning which would carry out this decision.

The Committee then adjourned till next morning, when the clauses were adjusted, and the Bill ordered to be reported.

HOUSE OF COMMONS COMMITTEE.

Tuesday, March 20.

Before Mr. LEWIS FRY, *Chairman, Sir* JOHN KINLOCH, *Mr.* CORNWALLIS, *and Mr.* TREVELYAN.)

NORTH WARWICKSHIRE WATER BILL.

This Bill proposed to enable the Company to increase their capital by £48,000, with £12,000 borrowing powers; to extend the limits of supply to a number of rural districts in the neighbourhood of Coventry and Birmingham; and to construct the necessary works, consisting of wells and reservoirs, for the supply of the extended district. In the course of the proceedings, it transpired that there was no opposition to the preamble, and that the main contest was on the question of the term within which the Local Authority should be allowed to purchase the works.

Mr. BALFOUR BROWNE, Q.C., Mr. WEDDERBURN, Q.C., and Mr. W. H. LEESE represented the promoters. The opponents were the Meriden and Solihull Rural District Councils, for whom Mr. FORBES LANKESTER and Mr. BASSETT HOPKINS respectively appeared.

Mr. BALFOUR BROWNE, in opening the case, said that most of the Local Authorities were in favour of the Bill, and that an arrangement had been come to between the County Council and the promoters that the Company should be allowed to supply for 25 years, after which any of the Local Authorities should be at liberty to acquire the portions of the undertaking within their districts. These were terms which, he thought, ought to satisfy all the opponents; but the two District Councils wanted what he regarded as unreasonable—they wanted the right to purchase the works at any time. This was contrary to every precedent and every principle of fairness. The Company were quite prepared to embark the shareholders' money in the works if, as in the case of tramways or electric light, they were allowed a certain time to recoup themselves; but no one would invest his money unless he saw that there was a chance of getting some return for it.

Mr. LANKESTER said that was not the case of the opponents. In the clause which they suggested, they proposed to purchase the "undertaking;" and if there was any value in it, they would certainly have to pay for it.

Mr. BALFOUR BROWNE said that, even though the "undertaking" were purchased, it might be that the Company had just put down £1000 worth of pipes, and had not even commenced to supply, in which case there would be no value in the "undertaking." They must have some continuity of tenure.

Formal evidence was tendered in support of the preamble.

The CHAIRMAN inquired if Solihull objected to be included in the Bill.

Mr. BASSETT HOPKINS said they did not object to being included, if they obtained the right to purchase when they were so advised, because there would be a proposal at some future time for joint action, and they might at some later period be able to combine their interest with the interest of the city of Birmingham, and thus be partakers in the advantage of a great public supply from Wales. They did not want to be bound hand and foot to the Company for ever, or even for 25 years. They wished to be in a position to buy at any time that they desired.

Sir J. KINLOCH: If the conditions you ask should be applied to all the other districts, it would be impossible for the Company to succeed. No one would invest his money.

Mr. LANKESTER admitted that they all ought to have the same sort of right; but if protection were given only to the two opposing districts, they would be satisfied. There was not the slightest doubt that Birmingham wanted to supply the whole of the Solihull district (as they now supplied a part), as soon as they conveniently could, and that the district would prefer to be supplied with Welsh water rather than with water pumped from wells by the Company. He suggested that the purchase term should be reduced to ten years.

Mr. BALFOUR BROWNE said that if this concession were made to the two opposing districts, when the Bill came before the House of Lords they would have all the other districts seeking to obtain similar rights.

The CHAIRMAN said they might assume that, whatever clause the Committee adopted, it would be a general one, applying to the whole of the area.

The CHAIRMAN, after deliberating with the Committee in private, declared the preamble proved. As regarded the power to purchase, the Committee thought a general clause should be adopted applying to all of the rural districts; and they proposed to reduce the period from 25 to 10 years.

Other protective clauses asked for by the petitioners—relating to an indemnity for the abstraction of water from existing wells and springs, and to a waiving of the charge in case the water supplied by the Company should not be of a potable character—were rejected by the Committee; the Chairman declaring on the latter point that the consumer was sufficiently protected under the general law.

The Bill was then ordered to be reported for third reading.

HOUSE OF LORDS COMMITTEE.

(*Before Lord* WINDSOR, *Chairman, the Marquis of* GRANBY, *Lord* NEWTON, *Earl* LUCAN, *and Earl* VERULAM)

HIGHAM FERRERS WATER BILL.

By this Bill, which came before the above-named Committee of the House of Lords on Tuesday last, the Higham Ferrers Water Company sought power to construct works for the supply of water to Higham Ferrers, in Northamptonshire, and adjacent villages. At present, the district is supplied from shallow wells. The works have been designed by Mr. Thomas Hennell. It is proposed to impound the waters flowing from about 2000 acres, by an embankment 32 feet high across the valley. The rainfall of the district has averaged 26 inches for 25 years; and the Engineer anticipates getting a supply of 650,000 gallons a day. There would be a reservoir of a capacity of 131,000,000 gallons, or 262 days' storage at 500,000 gallons daily, which he considered would be an ample supply. The water would be filtered at the storage reservoir, and pumped into the service reservoir. It was not proposed to pump any spring or underground water. The capital of the Company was put at £72,000. The estimated cost of the works was £25,000, of the mains £22,000, and of the branches £20,000. The original Bill gave no allowance for compensation water; but the promoters expressed their willingness to consider any suggestion of the landowners in this direction.

The need of a water supply was proved by Mr. Palmer, Mayor of Higham Ferrers, Mr. Owen Parker, the ex-Mayor, and Dr. Crewe, the Medical Officer of Health. The only opposition was from the local landowners, who contended there was no public necessity for taking the water, spoiling the brooks, and depriving them of their rights. The Committee ultimately passed the preamble of the Bill subject to a sufficient and satisfactory compensation clause. It was agreed that the Company should give compensation water to the extent of 100,000 gallons a day, with the addition of an extra provision of 100,000 gallons for the ten days in the year when the sheepwashing is in progress. The Bill, as amended, was ordered to be reported to the House.

The Waste of Water at Epsom.—At a recent meeting of the Epsom District Council, the important question of the water supply of the town, about which many complaints have been made, came up for further consideration. Some time ago, Mr. Graham, Engineer of the Sutton Water Company, was appointed to investigate the matter. As the result, he found that 60 gallons of water were being consumed, or wasted, daily per head of the population. A waste inspector was subsequently appointed, and in the month of February he served 81 notices. He found in one place that there were 700 gallons of water per hour running to waste, and close by 520 gallons. All the mains, however, were sound; therefore the waste occurred between the pipes and the consumers, but it did not rest with the latter entirely, as the Council had allowed certain things to accumulate which ought not to have existed. Of the 81 notices, 34 had not been complied with, and 22 of the houses belonged to one owner. Mr. Graham had attended a meeting of the Water Committee, and recommended that every house should have a separate supply, and that wherever stopcocks were difficult to get at, or were faulty, they should be remedied. This the Council agreed to do. When the matter was attended to, Mr. Graham was quite certain that they would have as much water as they could possibly need for very many years to come. Mr. Aston, who brought these facts before the Council, said they were beyond argument, and showed that it was possible, by husbanding their resources and exercising their powers, and also by enlisting the sympathies of the ratepayers, to about halve the quantity of water consumed. If they did this, he was confident that in the future they could look forward to having practically an abundant supply.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE (IRELAND)—CHANCERY DIVISION.

Saturday, March 24.

(*Before the* MASTER OF THE ROLLS.)

Alliance and Dublin Consumers' Gas Company v. County Council of Dublin—Damage to Gas-Pipes by Steam-Rollers.

This case, the proceedings in which were reported in the "JOURNAL" last week (p. 752), was decided to-day.

The MASTER OF THE ROLLS, in giving judgment, said he had no doubt the injury at Cabra Road was caused by the use of the steam-roller; but he was not sure it might not have been caused by ordinary traffic. What was called by some of the witnesses a syphon-box, but what was in reality a pressure-box, was set there to test the pressure of the gas supplied in the mains. This box was, in his opinion, placed too near to the road surface; in fact, it was actually above the road—some of the witnesses stated 2 inches. This, of course, was improper, and on a public road would be a nuisance; and he was not satisfied that the box was properly fixed. Not as a matter of law, but of common sense, such appliances should have a secure foundation of concrete, brick, or other firm material which would prevent them from being forced down on the pressure-pipe. At the same time, he did not believe it was left, as had been suggested, resting on a bunch of hay; but he declined to hold that in this case the damage resulted from anything special or peculiar to the steam-roller. The injury at Kilmacud was caused to a main on the slope of a bridge over the Dublin, Wicklow, and Wexford Railway. It was said there was no proof that the roller had been seen there after the 3rd of October; and as the first complaint was not made until the 23rd, the injury could not have been caused by the roller. Mr. Collen, while not admitting that it was broken by the roller, did not take up the position that the roller had not been there, or could not have caused the damage, though he did not think it improbable that it might have been caused by a cart. His Lordship, however, found the roller was on the road about the time stated; and he was much struck by the fact that the defendants could have proved that it was not to blame by establishing an *alibi* for it, or by proving that it did not pass over the pipe. While they gave an amount of skilled evidence, they did not produce the drivers of any of their rollers. He thought the main was broken by the roller; but whether the defendants were responsible or not was a different question. The injury to the service-pipe at Sydenham was practically admitted to have been caused by the defendants. There was no evidence of there having been much traffic recently on the road in question; while the roller was undoubtedly working there. At Overton there was no evidence that the pipe was actually broken. It was drawn at its junction with the main. As to the injury at Harold's Cross, though liability was admitted, it was right to say that the explanation given was that the Tramway Company had opened the ground over the pipe, and had filled it in so loosely that Mr. Collen, sending the steam-roller to consolidate the road surface, and finding the subsoil soft, placed stones on it, which, being crushed in, caused the mischief. This explanation was hardly satisfactory. The main being 18 inches down, he (his Lordship) could not treat it as an unqualified admission, and the use of rollers, themselves unfit and unsuitable, as an accident of an isolated character. The main contention was that the defendants were not liable—the mains and pipes having been improperly laid, so as to be unsafe. He was of opinion that there was no negligence attributable to the defendants in the management of their steam-rollers. It was not shown that they worked them in an improper manner, or that they were improperly constructed, or heavier than those used elsewhere. Still less was it the case that they brought the rollers there, knowing where the pipes were, and not caring whether they injured them or not. The action was not really brought in respect of negligence in that sense. The only negligence in question was that with which the plaintiffs were charged—and it was relied upon by the defendants—that the mains and pipes were laid unduly near the surface of the road. That the damage would not have happened had they been laid at a greater depth seemed reasonably clear. The law furnished but one test as to what was and what was not the proper depth—viz., that it must be such as to render the mains and pipes safe from injury by ordinary traffic in the district in which they were laid. Several witnesses had been examined on both sides, some of them of great experience; and, in reference to Mr. Collen, he desired to repeat what he said during the trial, that he did not remember having seen a scientific witness—particularly one personally concerned in the case, as he was from his position—whose evidence was given with so much complete candour and fairness. By this he did not mean that he was a witness for the other side, but that he had told the truth. The witness, however, seemed to be under a misapprehension as to the law. At one time he thought, the use of steam-rollers being lawful, the defendants had the right to use them regardless of anyone. Other witnesses for the defence were of opinion that the mains and pipes were not placed deep enough; and perhaps he (his Lordship) would not be prepared to differ greatly from that. What was ordinary traffic to-day might not have been ordinary traffic ten, twenty, thirty, or forty years ago. Most of the witnesses for the defence included steam-rollers as ordinary traffic; but this was an entire fallacy, as these pipes were laid at a time when steam-rollers were not used, and traffic then included no such weights. The pipes and mains must have been properly laid then, because it appeared that they had stood the test of ordinary traffic during that time. When the first roller came on the road were the Gas Company to relay their pipes? This would mean ruin to the Company. Or were they to go after the rollers and patch and repair the injuries from time to time caused by them? That would be equally ruinous and disastrous. Their pipes and mains were adequate for a period approaching forty years. For the whole time not a single breakage by ordinary traffic had been proved. In his opinion, the use of the pipes for upwards of thirty years was far more convincing than any amount of mere opinion as to what ought now to be done. He considered, as a matter of fact, that the pipes were laid, though not so deep as more modern engineers would require, sufficiently deep to bear the ordinary traffic of these roads. The Grand Jury themselves, who were the road authority until quite recently, were entirely, in his opinion, committed to this view. Assuming that they took the most elementary view of what their duty was, they must have seen that the pipes were properly laid, as they were in the first instance. The law applicable to the case admitted of no dispute. A person who used a public highway was bound to do so with due regard to the rights and interests of others. If he employed for his own purposes a vehicle of unusual or extraordinary weight, or one carrying unusual and extraordinary loads, he did so at his peril, even if the user of such a vehicle was not in itself a nuisance or otherwise unlawful. In the present case, the user of the steam-roller could not be said to be in itself unlawful. Mr. Collen thought that he had absolute control of the roads, and that it was the business of the Gas Company to look out for their pipes if they came in the way of the rollers. Possibly the plaintiffs also went too far on the other side when they replied that the defendants were acting illegally in using the roller, though they may have only meant in using it so far as to injure pipes lawfully laid. [His Lordship quoted *The Gaslight and Coke Company v. The Vestry of St. Mary Abbotts*, and *The Guardians of Armagh Union v. Bell.*] If the defendants were liable at all, was it a case for an injunction? In his opinion, most clearly it was. The whole course of the defendants' evidence was that, if steam-rollers were ordinary traffic, the main and pipes of the plaintiffs' distributing system were not laid so as to be capable of supporting it uninjured. Consequently, if the use of the rollers was to continue without regard to anything but the convenience of the defendants, the destruction of the plaintiffs' pipes must follow, because the argument was that the pipes were so lightly laid that they were liable to be injured by ordinary traffic; and it followed *à fortiori* that extraordinary traffic was far more likely to injure them. He would grant the injunction against the use of steam-rollers as asked by the plaintiffs; but he would not give any decree as to damages, for the injuries were very trifling.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

Thursday, March 22.

(*Before Mr. Justice* MATHEW.)

Sheen v. Haynes—The Promotion of the Automatic Gas-Meter Company.

This was an action brought by the plaintiff against the defendant, to recover £1125 in cash and a like amount in fully-paid shares in the Automatic Gas-Meter (1895) Company, Limited, in respect of work done and money expended by him for and at the request of the defendant. He alleged that £1125 was due to him in connection with his having journeyed to Manchester on the defendant's business, and of his having offered to provide a sum of £10,000 in order to form and float a large company, with adequate capital, to acquire the property and undertaking of the Automatic Gas-Meter Company; his commission being at the rate of 7½ per cent. in cash. The defendant, the plaintiff further alleged, agreed to transfer to him £1125 in fully-paid shares; and plaintiff in the alternative claimed £2000 by reason of defendant's refusal to hand the shares to him. The defence was a denial of any agreement.

Mr. PICKFORD, Q.C., and Mr. F. DODD appeared for the plaintiff; Mr. DUKE, Q.C., and Mr. BODILLY represented the defendant.

Plaintiff gave evidence in support of his claim, and, in cross-examination, said he had several interviews with defendant on this matter in Liverpool, Manchester, and London. It was in Liverpool that the agreement on which his claim was based was made. The effect of the agreement was that they were to be mutually interested in the formation of a larger company at a time which was found most convenient.

Defendant was also called, and denied that he ever made any such agreement as that alleged by the plaintiff. He admitted asking plaintiff to find £10,000 in debentures; but he never promised to pay him 7½ per cent. in cash. The Automatic Gas-Meter Company was now incorporated with a new Company called "Meters Limited."

Mr. *T. G. Marsh* was called, and denied that the Company was under any necessity to enter into such a contract as that alleged by the plaintiff. It was a prosperous concern.

His LORDSHIP, in giving judgment, said the plaintiff in 1895 was a Director of a Company called the Breweries' Guarantee Corporation, which was intended to give guarantees for debentures or shares for a small commission. The defendant was Director of a Company called the Automatic Gas-Meter Company, which had recently been established, and which obtained the assignment of a valuable patent. In October, 1895, it was found necessary that the Company should obtain further capital; and defendant, representing them, was put in communication with the plaintiff. The first proposal was that the capital of the Company should be increased to the extent of £10,000 in debentures, which were to have been guaranteed by the Breweries Corporation. According to the plaintiff's story, he suggested a different way of proceeding. He proposed that a new Company should be formed to take over the assets of the old one, and that the new concern should pay a much larger sum than was to be paid to the shareholders of the previous one. These two gentlemen understood each other, and knew that if the new Company were formed, as was suggested, there would be a handsome margin of profit to be divided among the promoters. This idea struck the defendant as feasible; and they arranged together that they should be concerned in the promotion of the new Company, and that there should be an opportunity of sharing the profits. Three representatives, including the plaintiff, inspected the works. When the plaintiff went, he at once saw the defendant, who imparted to him the intelligence that the idea had been taken up warmly by a Syndicate at Manchester, and that they proposed to promote the new Company without the assistance of the plaintiff. Plaintiff expressed his annoyance; but the defendant consoled him by saying that his position should be the same as if the arrangement come to between them had been carried out. He suggested that the inspection of the property should take place, and the opinion of the Breweries Corporation be ascertained as to whether the property was security for the £10,000, as this would facilitate the arrangement with the Syndicate. The Syndicate had a meeting at an hotel, and decided to bring the new Company out, and to form themselves into a limited liability undertaking, called "Commerce, Limited." Plaintiff gave a dinner at the hotel when all the gentlemen were present; and he said that at this dinner an arrangement was come to that he was to have 7½ per cent. in cash on

account of the 15,000 shares which he was to underwrite. The plaintiff and a Mr. Smith succeeded in placing the shares they had underwritten. The defendant did not, and he incurred liability in regard to another Company—the Holophane Company—in which he was interested with the plaintiff to the extent of some £3000 or £4000. He was pressed by the Holophane Company to pay the money; and, under pressure, he gave them an order on the plaintiff to pay whatever was due to him in respect of the agreement entered into for the underwriting of the Holophane shares. Plaintiff then prepared a statement of account, which showed a balance of £750 due to the defendant. This amount was paid in September, and evidently accepted by the defendant as correct; but a difference arose, and there was an action in Chancery between the parties. As to the amount now sued for, the defendant's case was an absolute denial of everything alleged by the plaintiff; but, after carefully considering the evidence, he had come to the conclusion that the plaintiff had made out his case, and was entitled to what he asked. He therefore gave judgment for £1125 in cash; and, as to the shares, he left it to Counsel to arrange the exact figures and mention the matter to him again if necessary.

BIRMINGHAM WINTER ASSIZES.

Nisi Prius Court—Tuesday, March 20.

(Before Mr. Commissioner Walton, Q.C., *and a Jury.)*

The Baker Syndicate, Limited, and Foster v. John Wright and Co., Limited, and Others—The Promotion of a Gas-Meter Company.

This was an action brought by the Baker Syndicate and Mr. Harry Seymour Foster, M.P. for Lowestoft, against Messrs. John Wright and Co, Limited, gas-stove manufacturers, of Birmingham, Mr. Ernest Wright, Mr. J. Frederick Wright, and Mr. A. G. Sutherland, to obtain damages for an alleged breach of contract, and to recover money paid in connection with the contract.

Mr. Jelf, Q.C., Mr. Stanger, Q.C., and Mr. Gordon appeared for the plaintiffs; Mr. Hugo Young, Q.C., and Mr. Wills represented the defendants.

Stated shortly, the case for the plaintiffs was that the Syndicate had purchased a patent invention, and were proceeding to form a company in London for the purpose of the manufacture of the patent, when they were brought into contact with Messrs. John Wright and Co., who persuaded them, it was alleged, not to proceed with the London Company, but to start a Birmingham Company, of which they (Messrs. Wright) would be the promoters. This agreement was accepted, and the arrangements were nearly carried out, when the defendants repudiated the contract. The plaintiffs had to make compensation to various people in connection with the preparations for the formation of the London Company, which had been given up, it was alleged, on account of the defendants' proposal. On the other hand, the defendants alleged that no concluding contract was entered into, and further that the Managing-Directors of Messrs. John Wright and Co. had no authority, and never represented that they had any authority, to bind the Company to any contract, although they had authority to negotiate.

Mr. Jelf explained the details of the case in the course of a long opening statement. He said that the plaintiffs were a London Company started for the purpose of forming and financing various industrial undertakings. Mr. Foster was the Chairman, and had a large interest in the concern. Mr. Ernest Wright and Mr. J. Frederick Wright were joint Managing-Directors of Messrs. John Wright and Co.; and they were brought into the action because the Company said they had no authority to make the contract. The other defendant, Mr. Sutherland, was a foreman in the Company's employ, against whom at one time a cause of action might have been made out; but he (the learned Counsel) did not think he was in a position to establish liability against him. The patent referred to was one which Messrs. Greenall and Heaton had invented and sold to the Syndicate. It was called the "Positive" gas-meter, which had been found an extremely useful one, and had been approved by legal authorities, patent agents, and commercial men. The plaintiffs, having purchased the patent, proceeded to promote a Company to work it. Out of the £40,000 which required to be underwritten, they had obtained the sum of £25,000; and Mr. Foster was recommended by Messrs. Agar, Bates, and Co., accountants, to see whether Messrs. John Wright and Co. would be likely to do the balance of the underwriting. Accordingly, on July 27, 1898, an interview took place on the premises of Messrs. Wright between Messrs. Foster and Greenall and Messrs. Ernest & J. F. Wright. Mr. Foster proposed an arrangement with regard to the underwriting and the manufacture of the meters. No settlement was arrived at, however; the two Mr. Wrights promising to consider the matter. On the 29th of July a letter was written on Messrs. Wright's notepaper to Mr. Foster, asking him to meet them again, as they had a proposal to make. They stated that they had a penny-in-the-slot attachment of their own, and were about to bring out a Company to manufacture it, and also ordinary gas-meters, in connection with Messrs. John Wright and Co. It had occurred to them that this Company might run with the plaintiffs' proposed meter company. They had, the letter continued, the necessary buildings, plant, and staff, both for their manufacture and their sale. They would only be willing to join forces, however, on condition that the flotation was a moderate one.

Mr. Hugo Young pointed out that the letter was not signed on behalf of the Company, but by Messrs. J. F. & E. Wright; and the reply was to be sent to Mr. J. F. Wright's private address.

Mr. Jelf (continuing) said an interview took place between Mr. Foster, Mr. Greenall, and Messrs. J. F. & E. Wright, in the Conservative Club, Birmingham; and on that occasion the agreement upon which the action was brought was accepted. The two Mr. Wrights told Mr. Greenall that they had authority to bind the defendant Company, and that, in fact, they were the Company. The terms were that the defendants were to pay all the expenses in connection with the formation of the proposed Company to the first allotment; and they were to provide on their premises, in Thimblemill Lane, Birmingham, a meter-shop, and be prepared to turn out 10,000 "Positive" meters in a year. Also that the defendants' existing stock of meters should be purchased and taken over by the new Company. The defendants were to do all the clerical work, allow the use of their travellers by the new Company, and hand over any improvements. In return for this the defendants were to receive 30,000 fully-paid shares in the new concern. Messrs. Wright said it must be a Birmingham Company; and they stipulated that two of them should have seats on the Board. Mr. Foster accepted these proposals, and put an end to the arrangements in connection with the London Company which was being formed. Everything was carried out to the registration of the Company, when the defendants repudiated the contract and their liability.

Mr. Hugo Young here stated that the defendants' case was that there had been no concluded agreement with the Wrights. They had no authority from the Company to do more than negotiate.

Mr. *Harry Seymour Foster* was called, and examined by Mr. Stanger. He said he was the Chairman of the Baker Syndicate, and his offices were at 165, Fenchurch Street, London. In the early part of 1897, his attention was called to the "Positive" meter, which was tested by a number of experts and eminent men, whose reports were entirely satisfactory. The patent was purchased, and preparations were made for the formation of a London Company—a sum of £2000 having been spent in connection with it. Speaking of the interview at the Conservative Club, Birmingham, he said that Mr. Ernest Wright was the principal spokesman. He asked witness to abandon his London scheme, and put his meter into their Company. Their proposal was that Messrs. John Wright and Co. should float the Company with a capital of £120,000. The plaintiffs were to have £30,000 of this, Messrs. John Wright and Co. £30,000, and Messrs. J. F. & E. Wright and A. G. Sutherland £30,000 for their penny-in-the-slot meter patent. Mr. Greenall asked what authority they had to bind Messrs. John Wright and Co., whereupon witness said Mr. Wright replied that he and his brother were Messrs. John Wright and Co. In October, there was another interview between witness and the two Messrs. Wright, when one of them said they had very bad news for him. They had had a Board meeting, and their Chairman had declined to sanction the agreement, on the ground that Messrs. John Wright and Co. would be injured in their business if people subscribed shares on the strength of their name and it proved a failure. Mr. Ernest Wright said he felt bound to agree with the Chairman (Mr. Sanders); and those were the points he himself had previously raised.

Mr. Foster was still under examination when the Court rose.

Wednesday, March 21.

On the resumption of the proceedings to-day,

Mr. *Foster* was severely cross-examined by Mr. Young on the subject of the various undertakings in the promotion of which he had been engaged since 1881. He was then cross-examined on the subject of the agreement with Messrs. Wright, with the view of showing that the defendants had not heedlessly repudiated the contract.

An argument arising on this point,

The Commissioner said the real question was whether or not the defendants had done their best to carry out the agreement.

Mr. Jelf maintained that the contract only bound them to do their best.

In further cross-examination, witness admitted that the defendants received a report from Mr. Dugald Clerk, which was on some points adverse to their patent. He did not think it would have been of any use going to the public on this report. He would have consulted some higher authority on patents. He would have gone to the public with one man saying it was valueless, and another saying it was good.

Mr. *John Greenall*, the inventor of the "Positive" meter, corroborated Mr. Foster's version of what happened on the occasion of the interview at which the agreement with Messrs. Wright was come to. He was certain they said they had full authority to pledge the Company.

In cross-examination, witness admitted that Messrs. Wright intimated that they would have to consult the Directors.

Evidence having been given by two witnesses as to the value of the patent in question, the plaintiffs' case closed.

Mr. Young submitted that there was no case to go to the Jury. He objected that there was no concluded agreement, and that, if there were, the one set up in the statement of claim was not it. There was merely a contract to contract.

A long legal argument ensued. Eventually,

The Commissioner held that there was evidence to show that there was a complete contract, and therefore he could not stop the case.

Mr. Young then objected that there was no clause in the Articles of Association of Messrs. John Wright and Co. which gave power to enter nto such a transaction as that which had been alleged.

Thursday, March 22.

At the sitting of the Court this morning,

Mr. Jelf said he was pleased to inform his Lordship and the Jury that he need not trouble them further, as the case had been settled. He therefore asked to be allowed to withdraw the record.

The request was granted.

It is stated that the result of the case reported above was that the defendants submitted to judgment for £900 and costs.

The Recent Committal for Selling Infringing Mantles.

In the Chancery Division of the High Court of Justice last Friday, Mr. Hughes applied to Mr. Justice Kekewich, on behalf of George Collins, of Birmingham, who was recently sent to gaol for breach of an injunction restraining him from selling mantles which were an infringement of those manufactured by the Welsbach Incandescent Gas-Light Company (see *ante*, p. 685). Mr. Hughes said the defendant was sorry for his offence, and asked that he might be released. He had already been in gaol for a fortnight. Mr. Walter, who appeared for the Company, said they did not wish to press unduly; but this was the third time they had had to proceed against the defendant. If, however, he would undertake not to offend again, he (Mr. Walter) would not oppose the application for his release. His Lordship made an order accordingly.

MISCELLANEOUS NEWS.

THE SHREWSBURY GAS COMPANY AND THE CORPORATION.

Award in the Recent Arbitration Proceedings.

As the result of the arbitration reported in the "JOURNAL" for Feb. 27 and March 13—with respect to a claim for £1583 made by the Shrewsbury Gas Company against the Shrewsbury Corporation, as compensation for damage alleged to have been caused to their mains, with consequent loss of gas, in carrying out the new system of sewerage in the town—the Umpire (Mr. James Mansergh) yesterday week gave his award. He finds that "the Company have sustained damage by reason of the exercise of the statutory powers vested in the Corporation in relation to the carrying out and construction of the sewerage works;" and he assesses the amount of the compensation to be paid to the Company by the Corporation in respect of such loss or damage at £930. He orders the Corporation to pay to the Company three-fourths of their costs of and consequent upon the reference, as well as all the costs of the award.

THE TRANSFER OF THE LOUGHBOROUGH GAS-WORKS TO THE CORPORATION.

Arbitration Award.

In the session of 1899, an Act of Parliament was passed by which the Loughborough Corporation were empowered to purchase the undertaking of the Loughborough Gas Company, on terms to be settled by arbitration; and the matter was subsequently referred to Mr. Corbet Woodall for the Company and Mr. Alfred Colson for the Corporation. The award was taken up last week, when it was found that the figure arrived at as the value of the works and plant was £87,098. By the provisions of the Corporation Act of last session, the Corporation have to pay 10 per cent. on the purchase price, as compensation for compulsory purchase, and £500 towards the Company's costs, together with the expenses of arbitration, transfer of the undertaking, and winding up of the Company. The mortgage debt of the Company (£8750) is to be taken over with the concern, and constitute a first charge on the property.

BRITISH GASLIGHT COMPANY, LIMITED.

The Half-Yearly General Meeting of this Company was held last Wednesday, at the London Offices, No. 11, George Yard, Lombard Street, E.C.—Mr. J. HORSLEY PALMER in the chair.

The SECRETARY (Mr. H. B. Chamberlain) read the notice convening the meeting, and also the report of the Directors for the six months ending Dec. 31 last. The latter stated that the balance of profit was £22,006, after making certain deductions, and adding £347 from the Trowbridge reserve fund; the parliamentary interest at that station not having been realized by this amount. The deductions referred to were: Income-tax £798, Hull excess profit £867, Potteries do. £1176, Hull debenture interest £1015, Norwich do. £918, Potteries do. £386; making, with the shillings and pence, £5162. Regarding the Hull station, the gas-rental showed an increase of £2528, as compared with the corresponding period of 1898. Coke contributed an additional £2062, tar and tar distilling £1440, and ammoniacal liquor and sulphate of ammonia £164. Coal cost 11s. 8d. per ton, against 10s. 8d.; and coke realized 10s. 2d. per ton as against 8s. 1d. The gas sent out was 467,459,294 cubic feet, as against 447,245,751 feet, or an increase of 20,213,543 feet—equal to 4·51 per cent. The profit realized was £867 in excess of the parliamentary interest allowed. This sum had been invested in Consols; making the reserve fund at this station £36,102. Concerning the Norwich works, the gas-rental showed an increase of £2786. The receipts for coke increased by £894, and tar and ammoniacal liquor by £392. Coal cost 15s. 10d. per ton, as against 15s. 1d. Coke realized 10s. 1d. per chaldron, as compared with 8s. 7d. The gas sent out was 177,608,000 cubic feet, as against 157,803,000 feet, or an increase of 19,805,000 feet—equal to 12·55 per cent. The profit realized was £3481 less than the parliamentary interest. As to the Potteries station, the gas-rental exhibited an increase of £1917; and coke, tar, ammoniacal liquor, and sulphate of ammonia £1529. Coal cost 10s. 9d. per ton, against 8s. 11d.; and coke realized 7s. 3d. per ton, as compared with 4s. 11d. The gas sent out was 186,968,000 cubic feet, as against 169,942,000 feet, or an increase of 17,026,000 feet—equal to 10·01 per cent. The profit realized was £1176 in excess of the parliamentary interest allowed. This sum had been invested in Consols; making the reserve fund at this station £19,298. Respecting the Trowbridge undertaking, the gas-rental showed an increase of £354; and the residual products realized £177 more. Coal cost 14s. 11d. as against 13s. 7d.; and coke produced 7s. 9d. per chaldron, as against 6s. 3d. The gas sent out was 29,125,006 cubic feet, as compared with 26,546,067 feet, which was an increase of 2,578,939 feet—equal to 9 71 per cent. The profit realized was £347 less than the parliamentary interest. This sum would be taken from the reserve fund; leaving a balance of £2775 to the credit of that account. In regard to the Holywell station, the gas-rental showed an increase of £42; and the residual products of £57. The profit realized was £270. The result therefore was that the total profit added to the previous balance of profit and loss amounted to £47,091. From this the Directors recommended a dividend at the rate of 10 per cent. per annum, clear of income-tax. This would amount to £21,000, and leave a balance of £26,091.

The CHAIRMAN, in moving the adoption of the report and accounts, said he was afraid on this occasion he should have to keep the shareholders a little longer than usual, as there were a good many points of interest upon which he wished to remark. First of all, with regard to the balance of profit, he might state that it was exactly the same as, or within £12 of, the profit realized in the corresponding half of 1898. Dealing with the Company's stations in detail, and taking the one of greatest importance first—that was, Hull—he said they had done a great deal of good work there during the past half year. There had been an increase of nearly 5 per cent. in the output of gas, and a very considerable rise in the total of the slot meters and stoves fixed. Generally, the business at Hull was progressing in a most satisfactory manner. With such progress as this, and with the large amount of gas they would have to provide for the Corporation to supply the Kingston-upon-Hull district from the 1st of next month, it naturally followed that a substantial capital outlay was required. In one of the districts—that was, the south-eastern district of Hull, in the direction in which the North-Eastern Railway Company's depôts and warehouses and a portion of the new docks were—the pressure of gas was very insufficient; and, in order to meet the needs of that district (which was growing very much), the Directors had given out orders to the pipe makers, and also to their Contractors (Messrs. John Aird and Sons) to lay a large sized main into the district. This would cost about £13,000. The quantity of gas which they would have to supply to the Corporation for the Kingston-upon-Hull district was estimated at 110 million cubic feet; and, in consequence, they required increased storage to provide for this. As he informed the shareholders six months ago, they had in progress a large gasholder and tank. The tank, which was begun last half year, was almost completed; and during the coming summer, the gasholder would be put in. They had also to erect new condensers and scrubbers for the same purpose. The coupling up of the mains to supply the old town had been completed, the meter had been tested, and everything had been found in working order; and, as he had said, delivery of gas would commence on the 1st of April. Roughly speaking, the total capital required for Hull would be about £70,000. There was one thing he had to regret; and it was that their Engineer, Mr. Dougall, had been far from well. He had had a great strain put upon him by all this new work; and the Directors had been obliged to enforce his taking a very considerable holiday. He was now in the South of France, and was very much better. The Directors sincerely hoped that he would return to his duties completely restored to health in perhaps a month or more. Their Chief Engineer was one of those gentlemen who would stick to his work until the last moment—until, in fact, the Directors absolutely forced him to take a rest. He (the Chairman) had little to tell the shareholders with regard to Norwich, because they had not been executing any important works there. The increase in the consumption of gas, however, was immense. It was 12½ per cent. over the half year; and, therefore, the Directors hoped they were picking up the ground that was lost there in years gone by. With regard to the Potteries station, he had a good many things to say to the shareholders. It would be remembered that a few weeks ago, a Wharncliffe meeting was held for the purpose of getting the shareholders to sanction the promotion of a Bill in Parliament to raise fresh capital and buy additional land at the Potteries station. At that time, he fully explained to the shareholders present the necessities of that station. The action of the Shelton Coal Company, who were undermining their works, necessitated the construction of new works. The increase in the consumption of gas was very large; and the demand on the existing works was nearly equal to the maximum output. Therefore they were obliged, in addition to any defects owing to the Shelton Coal Company's workings, to increase the works by putting up fresh plant and buying additional land. He stated at the Wharncliffe meeting that he hoped there would be no opposition to the Bill. At the last moment, however, the Corporation of Hanley had decided to oppose it; but, on the other hand, the Company's friends at Tunstall said there was no necessity for opposition, and had refused to join in it. The opposition, however, was of such a weak nature that he hardly believed it would be carried before a Parliamentary Committee. Anyway the Bill would not come on until after Easter; so he did not like to prophesy. They had expended on capital account at the Potteries £1280, and about £560 for stoves. The increase in slot meters and stoves still continued; and the average consumption of gas by the slot meters was 10,424 cubic feet, which, so far as this class of business went, was a very satisfactory return. The land the Directors had purchased was contiguous to the present works, and alongside the North Stafford Railway; so that they would have a very good opportunity in the future of getting their coal into the works at, they hoped, a somewhat cheaper rate than now. With regard to the subsidences which had occurred, some of the shareholders might say, "How is it you have not arranged to purchase the freehold" (because the Company's land was copyhold) "and come to some agreement that the coal should not be extracted from underneath the works." The Lords of the Manor, he might inform the proprietors, were the Duchy of Lancaster; and although portions of the land had been enfranchized, whenever the Directors approached the Duchy of Lancaster to enfranchize the copyhold, the latter would insist upon the insertion in the deed of a clause reserving the minerals, and debarring the purchasers from any claim for damage by reason of mining operations. Therefore, it was hardly worth while enfranchizing the copyhold with such a clause inserted. With regard to the smaller station at Trowbridge, there again there was a very large increase—above 10 per cent.—in the consumption of gas. The Directors had thought fit to remodel these works, which were very old. In this matter (although only a small one), they had had valuable help and assistance from their colleague, Mr. Corbet Woodall, who had gone very fully into it. The retort-house had been remodelled; and a new gasholder tank had just been finished. The holder for that tank was in course of erection; and during next summer it was intended to re-set the retort-beds on the regenerative system. Some other additions in the way of the enlargement of offices and new sulphate of ammonia plant would make the Trowbridge station quite a model country works. All this would necessitate the expenditure of about £9000. It was rather difficult to state, in round figures, the exact amount of money that would be required at the Potteries station for the land, new gasholders, and so on; but they would be spending very soon from £30,000 to £40,000. This brought him really to the last question he wished to touch upon—that was, the raising of fresh capital for the various purposes he had mentioned. It would be remembered that he stated the total amount to be spent at Hull would be about £70,000; at the Potteries it would be certainly £30,000 and probably more; and at Trowbridge £9000. It was the intention of the Directors to issue during the coming summer 1500 ordinary shares; and the shareholders would have notice sent to them in the usual manner, asking them to subscribe for the shares. This was all he had to say with regard to the actual position of their business; but there was one other matter upon which he might

make a few remarks. He believed every chairman of every gas company at the meetings lately had spoken about coal. The shareholders all knew that the price of coal was now very much higher than it had been in the last few years. The Company must face this matter; and the Directors thought the gas consumers should also assist in facing it. They could not expect to receive gas at the extraordinarily low price at which the Company had been in the habit of supplying it at two of their principal stations. At Hull it was 1s. 10d. per 1000 cubic feet, which was far below that charged by the other two undertakings there. Then at the Potteries the price was 2s. 3d., which was much less than was charged by undertakings in the neighbourhood, most of which belonged to Corporations. Therefore it was only fair that, when coal rose to such an extent as now, gas consumers should pay rather more for their gas than they had hitherto done. Nobody regretted more than himself the rise in the price of gas; but there were occasions when it must occur. The Directors had always made a point of selling gas at the lowest possible figure; and he was sure the shareholders were benefited thereby.

Mr. Corbet Woodall seconded the motion.

Mr. R. Stevens inquired at what price the Directors proposed to issue the new shares.

The Chairman said, while he would not make any pledge in regard to this matter, he might say that the Directors had always issued shares to the shareholders at a slightly beneficial "turn," if he might so describe it; and he had no doubt the Directors would remember the precedents when making a further issue.

The motion was unanimously adopted.

The Chairman moved the declaration of a dividend at the rate of 20s. per share, clear of income-tax. He reminded the shareholders that the income-tax was going to be 1s. in the pound; and therefore they might regard the payment of the dividend free of income-tax in the light of a bonus.

Major-General W. T. Corrie seconded the motion, which was agreed to.

The Chairman and Directors and the officials were suitably thanked for their services; and the acknowledgments of the Chairman and Secretary concluded the proceedings.

THE SUPPLY OF CARBURETTED WATER GAS IN DUBLIN.

As the outcome of Professor Emerson Reynolds's statement of the results of his analyses of the gas supplied to Dublin since the starting there of the carburetted water gas plant (see last week's "Journal," p. 756), a question was asked in the House of Commons on Friday, as noted elsewhere to-day, p. 806. On notice of the question being given, the President of the Board of Trade placed himself in communication with the Alliance and Dublin Consumers' Gas Company; and in a letter (dated the 21st inst.), the Secretary of the Company, Mr. Francis J. Cotton, wrote as follows:—

The Corporation and the citizens of Dublin were well aware of the Company's intention to introduce carburetted water gas. The matter was fully discussed in the Press before the Company completed the plant for its manufacture. On the plans of the building being submitted to the Corporation, they raised the question as to its use; and the matter was referred to Sir Charles Cameron, the City Analyst, to thoroughly investigate and report to the Public Health Committee. Sir Charles Cameron, after thorough investigation, recommended the Public Health Committee to approve of the plans.

There is no foundation in the statement that the Company has "turned 17 per cent. carbon monoxide into their mains." Professor Reynolds states that "the analysis of the 12th inst. showed a still greater proportion of carbon monoxide—17·9 per cent., but this was probably due to some accidental cause." On reference to the percentage of water gas used that week, it will be seen that 17·9 per cent. of carbon monoxide could not have existed in the mixture of gas issued to the consumers; and we can only conclude that Professor Reynolds has made some mistake in his analysis.

No notice was sent to the Board of Trade as to the intermixture of water gas with coal gas, as we know of no Statute bearing on the subject.

With regard to the poisonous nature of this gas, I am to refer you to the report of the Departmental Committee appointed by the Home Office to inquire into the use of water gas and other gas containing a large precentage of carbon monoxide—Jan. 17, 1899. It will be found on referring to this report that the use of this illuminant is not illegal in the United States.

With regard to leakage from the gas-mains in Dublin, they are no more frequent than in other cities, except where the mains have been broken lately by steam-rollers or traction-engines.

The statement "that since the introduction of water gas the death-rate amongst the population has risen so enormously that the Lord Lieutenant has appointed a Commission to investigate the cause," is absolutely without foundation. On the 17th of January, the Lord Lieutenant, in a letter addressed to the Secretary of the Local Government Board, suggested "that the present state of the public health in Dublin would appear to make it highly desirable that a public inquiry should at once be held by a Committee composed, if possible, of representatives of all the authorities concerned." Water gas was not manufactured, nor issued, by this Company before Feb. 5, and the increased death-rate in Dublin was principally among the very poor classes, very few (if any) of whom use gas.

With regard to the remainder of Mr. Healy's question, we must again refer you to the report of the Home Office Committee.

The return furnished by Sir Charles Cameron, the Officer of Public Health, shows that since Feb. 5 when carburetted water gas was introduced, the death-rate has been decreasing instead of increasing.

Electric Lamps Superseded by Gas Lights in Newcastle.—The Lighting Committee of Newcastle-on-Tyne Corporation, at a meeting held last Tuesday, decided to give notice to the Electric Lighting Company for the abolition of the large lamps in Blackett Street, Grainger Street, Neville Street, and Barras Bridge, and resolved that these streets be lighted with incandescent gas-lamps in groups, similar to those round the foot of the Monument.

GAS-WORKS EXTENSIONS AT ILKESTON.

Local Government Board Inquiry.

Last Thursday, Colonel J. T. Marsh, one of the Local Government Board Inspectors, held a public inquiry at Ilkeston, in connection with the application by the Corporation to the Central Board for a Provisional Order "to enable the Corporation to purchase and acquire by agreement and hold additional lands for the purpose of their gas undertaking, and thereon to construct, alter, enlarge, or, when necessary, remove buildings, apparatus, and works for the manufacture and storage of gas and of residual products, and to confer additional borrowing powers upon the Corporation, and to incorporate with the Provisional Order, with or without alteration, some or all the provisions of the Gas-Works Clauses Act, 1871, the Lands Clauses Acts, and the Public Health Acts."

The Town Clerk (Mr. Wright Lissett), in opening the case, stated that when the works were purchased from a private Company in 1878, they were of a very limited character, and the apparatus and plant were generally old-fashioned. The Corporation obtained a loan for the purchase money, and since then had spent large amounts on the works. The population of the town then was 12,000, and was now more than double—being about 27,000. The gas made in the year ending March, 1882, amounted to 26 million cubic feet, with 647 customers and 134 street-lamps. This last year the corresponding figures were 74 million cubic feet of gas, 2200 customers, and 382 street-lamps. There had been a continually increased demand for gas. The increase last year was 7 million cubic feet. The premises and plant had been several times enlarged and improved. The storage capacity in 1878 was 72,000 cubic feet; and now it was 350,000 cubic feet. In one day last winter they sent out as much as 400,000 cubic feet of gas, which showed the storage capacity to be insufficient. They had obtained a Provisional Order for electric lighting and tramways, but no installation was yet established.

The Inspector remarked that the universal experience was that the provision of electricity did not affect the output of gas.

The Town Clerk went on to deal with the provision to be made for plant for treating ammoniacal liquor and coke, which added to the profits on the works. New purifiers were now absolutely necessary, an additional washer was needed, and more storage capacity for coal and coke was required. Another very important thing was to get additional railway sidings; the present limited and awkward accommodation involving considerable delay at times. Other requirements were a new station-meter and exhauster.

Plans of the land and properties proposed to be taken were then examined. The estimated cost of purchase, including the enfranchizement of one portion which was copyhold, was £4000.

The Town Clerk explained that the land adjoined the present works, and was a very convenient site for the purpose. The whole of the existing site was fully occupied; and it was necessary to get additional land close at hand, as unless they could do so they would have to secure land elsewhere and so erect a separate plant and gas-making station altogether—thus increasing the cost of supervision and working. The present truck entrance from the Midland Railway involved expenditure in the shape of horse haulage for every truck taken in, and the new sidings and direct entrance would be a great advantage.

The contracts for the purchase of the properties were then submitted for the Commissioner's inspection.

The Town Clerk pointed out that on the south side of the new site there was no probability of buildings being erected. The land on the other side of the railway was used by the Corporation as a depôt; and on the east side there was no prospect of other houses than those existing. On the north and west sides, there were populous districts. The matter had been well advertised, and there was no objection from ratepayers or property owners. All the houses now acquired by the Corporation were held on a weekly tenancy at a rent of 3s. 6d. or 4s. 6d. a week. It did not follow that all the houses would be cleared away, but some would. There were 34 houses being acquired.

The Inspector asked where they would place the dispossessed persons.

The Town Clerk thought they would only take 16 houses. The matter of further accommodation had not yet been considered.

At the close of the inquiry, the Inspector visited the gas-works.

MANCHESTER CORPORATION GAS AND WATER SUPPLY.

Increases in Salaries—The Disturbance of the Streets.

At the Meeting of the Manchester City Council last Wednesday, a long list of recommendations from the Gas and other Committees, for advances in the salaries of officials, came up for consideration.

Alderman Gibson, Chairman of the Gas Committee, in proposing that the salary of Mr. Charles Nickson, the Superintendent, be raised from £600 to £700 per annum, said he could give such reasons for the proposal as would, he was sure, meet with the approval of the Council. Mr. Nickson was appointed Chief Superintendent in 1883. In that year the turnover of the Gas Department was £834,686 per annum; whereas last year it had risen to £1,132,366. During the period of this increase, the department had been under Mr. Nickson's control; and yet he was to-day getting £100 a year less than his predecessor. Mr. Nickson had been a servant of the Corporation for 55 years, for 47 of which he had been connected with the Gas Department. Since he had been Chief Superintendent, his salary had only been advanced twice. That it had not been raised to a greater extent was due to his (Mr. Nickson's) own modesty; for during the time of his (Alderman Gibson's) chairmanship, this matter had never once been mentioned to him. He then submitted a few figures showing the economy in administration in the Gas Department (apart from the gas-works and the actual manufacture of gas) effected under Mr. Nickson's *régime*. He said that when that gentleman took office, the cost of administration was 17·89d. per ton of coal carbonized. Last year it was only 15·89d.; there having been a gradual diminution during the whole period. If the cost had been 17d. per ton last year, they would have had to pay £3625 more for salaries than they actually paid. This saving, he claimed, was due mainly to Mr. Nickson. Taking the accounts of other large undertakings as given

in "Field's Analysis," and on the basis, not of coal carbonized but per 1000 cubic feet of gas actually sold, he found the average of Birmingham, Bolton, Carlisle, Leicester, Nottingham, Oldham, and Salford, was 0·56d.; whereas in Manchester the cost was only 0·35d. These figures represented a very considerable saving in the cost of administration; and, in view of the economies effected during Mr. Nickson's tenure of office, and the large increase of business which had taken place, they would be doing him only a tardy act of justice in placing him on the same footing as his predecessor with regard to salary. Mr. Nickson was one of the best servants the Manchester Corporation had ever had.

The Lord Mayor (the Right Hon. Thomas Briggs), the Deputy-Chairman of the Committee, seconded the motion.

Mr. Wilson said that, while he had great respect for Mr. Nickson, and while every member of the Council knew he was an excellent servant of the Corporation, he thought that gentleman had reached too advanced an age to justify them in increasing his salary.

Mr. Shuttleworth moved, as an amendment, that the increase be only £50 per annum.

Mr. Hodge seconded the amendment.

Dr. Bishop asked if there had been any dissension among the members of the Gas Committee on this matter. He would also be glad to know if the recommendation was a unanimous one.

Alderman Gibson replied that when he first brought the matter before the Committee they voted against the proposal; but it was owing to the fact that there were many new members, who had no knowledge of Mr. Nickson's ability and worth. Subsequently, after he had fully explained the reasons of his proposal, it was carried by 10 votes to 4.

On being put to the vote, the amendment was lost—25 voting for, and 49 against it; and the original motion was declared carried.

The following advances of salaries were then adopted without discussion: Mr. F. A. Price, Deputy Superintendent, from £350 to £400; Mr. F. P. Smith, Accountant, from £250 to £275; Mr. F. J. Caldecott, Audit Clerk, from £250 to £275; Mr. G. Whittaker, Chief Inspector, from £225 to £250; Mr. J. R. Hill, Deputy-Manager, Rochdale Road works, from £280 to £300; Mr. G. W. Tooley, resident foreman at the Rochdale Road works, from £163 16s. to £180; Mr. E. Williams, Chemist, from £220 to £250; Mr. J. S. Naylor, Deputy-Manager, Bradford Road works, from £250 to £280; Mr. E. Parker, Chemist, from £163 16s. to £180; Mr. J. Taylor, Clerk of Works, from £163 16s. to £180; Mr. J. Merrill, Manager, Gaythorn works, from £300 to £330; Mr. A. Massey, Manager, Droylesden works, from £190 to £200; Mr. T. H. Walmsley, Deputy Superintendent, Street Mains Department, from £225 to £250. To a recommendation to raise the salary of Mr. W. Rodger, Manager of the Bradford Road works, from £350 to £380, an amendment was moved to increase it by only £10; but it was lost.

On the recommendation of the Water-Works Committee, various advances of salaries in that department were agreed to. The salary of Mr. Joseph Haynes, General Inspector and Surveyor of Mains, was raised from £425 to £475; Mr. L. Holme Lewis, Engineer and Manager of the hydraulic power supply, from £450 to £475; and Mr. Alfred Neill, Assistant Financial Superintendent, from £325 to £340.

Sir John Harwood proposed, and Alderman Higginbottom seconded, a motion to the effect that, as it was desirable to obviate the frequent disturbance of the surface of the streets in the city which were under the charge of the Paving, Sewering, and Highways Committee, any other Committees of the Council intending to interfere with the surface of the streets for any purpose should, except in cases of emergency, give notice to the Committee of their intention; and, upon receipt of such notice, it should be their duty to inform any other Committee having work to do of a kindred character, in order that it might be completed at the same time.

Mr. Fildes thought no good could come from the resolution, as it was impossible for employees of (say) the Electricity and Gas Committees to work on the same side of the street at one time; and it would be impracticable to have both sides of the street up at once.

Alderman Hoy agreed, to a large extent, with Mr. Fildes, and added that it might be well to consider whether, in the chief streets of the town, they could not have a large duct main which would carry the whole of the various Committees' underground work.

After some further discussion, the motion was carried.

THE PRICE OF GAS AT STOCKTON-ON-TEES.

An Increase Imminent.

According to the "Northern Echo," Stockton at present has to face the question of an increase in its rates, or the alternative of 6d. per 1000 cubic feet addition to the price of gas. During the Corporation financial year ending on the 31st inst., the Borough Fund Committee in making up their estimates last March allowed for a profit of £5000. Some few months after, however, the price of coal went up by leaps and bounds; and the Gas Committee found they could only complete their yearly contracts in July at enhanced prices. To counteract the decreased profit, the Corporation, on the recommendation of the Gas Committee, virtually increased the price of gas by 3d. per 1000 cubic feet. But later the resolution was rescinded by a majority of one, and the net price of gas fixed at 2s. 1½d. instead of 2s. 3d. The result has been that, instead of the £5000 estimated, the profit has been £3900. This amount of £1100 will have to be made up out of the present year's rates; and if the price of gas is allowed to remain as it is, the Gas Committee during the ensuing year, with the present high price of coal, instead of a profit, estimate a loss of some thousands of pounds. All this will have to be met in the current year's borough rate; and though the rates would have been considerably less this year—owing to a largely decreased loss on the water and wharf undertakings, and the fact that the rateable value of the borough has gone up very considerably during the year—the deficit can only be provided for by a 2d. borough rate in excess of last year, when it was 2s. 4d.

As an instance of the remarkable advance of coal, it may be stated (says our daily contemporary) that the Corporation, according to the quotations obtaining and expected to obtain, estimate that the amount of coal which cost them nearly £23,000 last year will cost them over £7000 more this. And it may also be of interest to add that if, as is proposed, the price of gas be increased 6d. per 1000 cubic feet from the 1st prox., the discount remaining at 15 per cent., the estimated profit of the gas undertaking will only be between £2000 and £3000, against the £5000 generally earned—showing that the 6d. will not meet the whole of the extra cost imposed by the coal famine. One of the overwhelming arguments in favour of the price of gas being increased in preference to the rates, from the ratepayer's point of view, is that if the loss falls upon the rates, he is paying for cheap gas for the inhabitants of Norton, Thornaby, and Eaglescliffe, who are outside the borough, and therefore do not contribute to its rates; and when it is stated that about one-fourth of the total make of gas is used outside the borough, it will be readily seen that this is a serious matter. To give an instance, of the £1100 loss or decreased profit last year on the gas-works, nearly £300 will have to be supplied by the Stockton ratepayer over and above what he should have if the outside districts had been called upon to pay for the increased cost of production, or 3d. instead of 1½d. per 1000 feet.

The Finance Committee of the Corporation met last Thursday to receive the estimates from the various Committees; and, after considering the matter, they came to the conclusion that it was the most business-like method to raise the price of gas. A special meeting of the Corporation is to be called for to-morrow (Wednesday) to receive the estimates and declare the borough and district rates for the ensuing municipal year. The Gas Committee have given notice of their intention to move that all previous orders relating to the price of gas in Stockton be rescinded, and that the price be increased by 6d. per 1000 cubic feet—making the net charge, after allowing the usual discount of 15 per cent. for payment within fourteen days, 2s. 7½d. in the borough, 2s. 9½d. at Thornaby, and other places in proportion. If the price of gas is not increased, the borough rate will be 2s. 6d. in the pound, against 2s. 4d. last year. But, on the other hand, if the price of gas is increased by 6d., the borough rate will be 1s. 7d., or a reduction of no less than 11d. Against this the district rate is increased 1d., which is accounted for largely, if not wholly, by the preliminary expense in connection with the new electric light works, and the fact that the first year's interest and redemption on the capital sum borrowed has to be paid without any return.

WATH-UPON-DEARNE AND DISTRICT GAS SUPPLY.

Board of Trade Inquiry.

At the Wath Town Hall, an inquiry was recently held by Mr. Ingram R. Walker, on behalf of the Board of Trade, relative to an application by the Wath-upon-Dearne Gas Company for power to supply gas in Bolton-upon-Dearne, Thurnscoe, and other places outside their present area.

Mr. F. Parker Rhodes appeared for the Company, to which he is the Solicitor; Mr. J. Ellison, for the Wath and Bolton District Councils, the Brampton Bierlow Parish Council, and the Wath Main Colliery Company; Mr. F. Nicholson, Clerk to the Doncaster Rural District Council, was in attendance on behalf of that body; and Mr. A. Clegg represented Viscount Halifax, the owner of property at Hickleton.

Mr. Parker Rhodes, in opening the case for the Company, said they commenced operations about the year 1844. For a long time they carried on their business without statutory authority; but at a later period they were incorporated. At that time, the Wath urban district was not of the same dimensions as it was now. It was then under the govérnment of one of the old bodies of Commissioners; and the radius over which they exercised jurisdiction was very limited. At a later period, when the Public Health Act was amended, the Urban District Council was constituted. Wath then endeavoured to extend its boundaries by taking in a portion of Brampton Bierlow. The Company were at that time supplying gas in Wath, and also in Brampton to a large extent. When the Wath Council took part of Brampton within their area, that supplied by the Company was outside the then new urban boundary. The population grew; and, as a matter of course, the consumption of gas increased. About two years ago the Company had become possessed of a small gas-works at Bolton-upon-Dearne, which had fallen into difficulties. They had acquired the works so as to furnish a supply of gas to the adjoining districts. A scheme had been launched which had led to the present inquiry. By it, the Company proposed to supply Wath, Brampton (if they so desired it), Bolton, and Thurnscoe. They also proposed to take powers to supply other townships, named Barmboro' and Hickleton. They were supplying gas in Bolton at the present time, and there did not appear to him to be any reason why the District Council should endeavour to prevent them from going into their district. The persons interested in this question were the consumers. With regard to Thurnscoe, mines had been constructed which caused a large increase of population which would in later years, he thought, be increased to an even greater extent. It was to supply this population that they were proposing to go into Thurnscoe; and the Parish Council supported the scheme. They could not go to Thurnscoe without passing through Bolton. This township was contemplating erecting gas-works; but the Company would be able to supply them at a lower rate than they could serve themselves from their own works. In respect to Brampton, he would like to know their requirements, and then they could have their wants supplied. There was a Gas Company at Elsecar who had parliamentary powers; and the whole of the parish of Brampton was within the limits of the Company. The proposed capital which the Wath Gas Company intended to raise was necessary to undertake future developments. The consumption of gas at the present time was 16 million cubic feet per annum, which was more than double what it was ten years ago. Gas could not be supplied at a less capital value than £1000 for every million cubic feet sent out; and it was estimated that the quantity annually consumed would be 43 millions—making a total of £43,000. The Company had supplied the township for fifty years and, as far as they knew, there had been no serious complaint.

The following evidence was then given.

Mr. *Thomas Clark*, in answer to Mr. Rhodes, said he had been for nineteen years Secretary to the Company, and for eight years a Director. The present capital was £20,000 nominal, of which amount £13,385 had been actually paid up. The capital in 1881 was £7500, when the quantity of gas consumed was 6 million cubic feet; and there had been a progressive annual increase up to 16 millions. The Company owned 3876 yards

of land, whereon the present Wath works were situate. The Company were proposing to enlarge the works, and lay a main through Bolton to Thurnscoe. The Bolton works would become auxiliary to the Wath establishment. They were cheaper and better that way than any other. The Company were asking for a maximum price of 5s.; but there was no intention of charging this amount.

Mr. ELLISON: If you get the Provisional Order, it would entirely end the question of Bolton having gas of their own?

Witness: That is so.

Mr. *W. Chapman*, a member of the Thurnscoe Parish Council, spoke as to the desire of that place to be supplied with gas.

Mr. *W. R. Chester* said the Company could not produce an increased quantity of gas without alterations to the works. The actual consumption in Bolton had been 1,620,000 cubic feet. He estimated that, at a proportionate rate of increase in population all round, the quantity of gas produced would be 26,700,000 cubic feet in excess in ten years. The present capital was £16,385, and the extent of increase applied for was £21,615 share capital and £5780 loan capital, which would raise the amount to £43,780. The Bolton Gas Company could not carry on the manufacture of gas for this place alone as cheaply as Wath could in their own urban district.

Mr. ELLISON said one could well understand the position of the Councils in opposing the application for the Provisional Order. The witnesses had proved beyond doubt that the district was most favourable for gas undertakings; and this was the reason the Gas Company had applied for the Order. The scheme was very strongly opposed by the inhabitants of Bolton. In the case of Brampton Bierlow, it was entirely a rural district, and there was no likelihood, in his opinion, that it would ever be publicly lighted.

Evidence in opposition to the application having been given, the inquiry terminated.

ELECTRIC LIGHTING NOTES.

On Thursday, Mr. H. P. Boulnois held an inquiry at Walsall with regard to an application by the Corporation to borrow a further sum of £15,000 for their electric lighting undertaking. The Town Clerk said the amount at present sanctioned was £30,350, and of this £29,385 had been expended. The margin of £1000 was for works included in previous estimates, and now in course of execution. He asked that the loan should be extended to 30 years, and pointed out that the limiting of the repayment to 25 years had seriously crippled many corporations. Mr. Boulnois intimated that he would consider the point.

At the meeting last week of the Huddersfield Town Council—when moving an addition of £100 a year to the salary of the Borough Electrical Engineer—Alderman Calvert, the Chairman of the Electric Lighting Committee, gave some interesting particulars as to the progress of the undertaking. Between 1896 and 1899, the capital expenditure had more than doubled. The consumers had increased from 385 to 1082; the lamps connected, from 28,983 to 70,178; the units metered, from 304,000 to 951,000; and the expenditure, from £3140 to £6660. The gross surplus had increased from £3728 to £9040; and in interest on loans and their repayment, the sum of £1789 had been paid.

The Maidstone District Council recently held a special meeting to consider the report of the Electric Lighting and Dust Destructor Committee, in which they recommended that, in addition to the mains provided for in the original scheme, others should be laid in certain streets specified; further, that more plant of various kinds should be procured; and that the resolution passed by the Council last October to apply to the Local Government Board for sanction to the borrowing of £30,000 should be rescinded, and application be made for £40,000 for carrying out the combined electric light and dust destructor scheme. The Mayor (Mr. E. Vaughan) moved the adoption of the report. He said some remarks had been made to the effect that the Council were not satisfied with borrowing £30,000, but wanted another £10,000. The idea of the Committee was that they should start the scheme on thoroughly good lines, and lay down plant which would do the work which was expected to come upon it. The results they had had from canvassing had been most gratifying; and this was the chief reason why the increase had been made in the sum to be borrowed. The Engineer had reported to the Committee that they had already more applicants for light than the plant could supply. Mr. Clark moved an amendment postponing the provision of the additional plant and cables until they saw whether or not the first instalment paid. The report was, however, adopted.

The Master Electrical Contractors' Association of Dublin have been pulling to pieces Mr. Hammond's report on the proposed extension of the electric light system in the city and the erection of a new generating station at the Pigeon House Fort. At their meeting last Thursday, they discussed the question all round, both from a financial and engineering point of view. For the scheme, borrowing powers to the extent of upwards of a quarter-of-a-million sterling are to be applied for. The Master Contractors are doubtful as to whether the scheme would result in that benefit to the ratepayers which Mr. Hammond's figures have led the Electric Lighting Committee to believe would accrue. They are also of opinion that the site selected is not such as will enable the Engineer to use the most suitable type of plant, or to work it at the highest efficiency; and its distance from the city means a largely increased outlay on mains, with a correspondingly heavy annual maintenance charge. As regards the distribution portion of the scheme, it is considered imperfect, as the lighting area would still be left as it is at the present time, without suitable provision for the supply of current for motors. It is further considered that the double, and possibly treble, transformation of current which forms part of the scheme will prove uneconomical, complicated, and liable to breakdown. In the opinion of the Association, the scheme is entirely overweighted by the enormous and uncalled for addition to the public lighting, which is entirely out of proportion to the revenue-earning load at present connected, and to the revenue-earning load which is likely to be connected for some years to come. To give the undertaking any chance of financial success, the extension of the public arc lighting should, it is thought, be deferred until a sufficiently large private connection has been secured to ensure that the profits accruing from the same will allow of the extension without unduly burdening either the ratepayers or the consumers of electricity.

OUTPUT OF COAL AND NUMBER OF PERSONS EMPLOYED IN COAL MINES IN 1899.

Preliminary Figures.

An advance proof has been issued by the Home Office, of the tables relating to the output of coal and other minerals, and the number of persons employed at mines under the Coal and Metalliferous Mines Regulation Acts, during 1899. The figures are subject to correction, and of a preliminary character only; and in the case of several important minerals, large quantities of which are obtained from quarries, they do not represent the total production of minerals for the year. The following figures relating to coal may, however, be regarded as substantially complete. The table shows the output, and numbers employed in each inspection district at mines, under the Coal Mines Regulation Act. It will be seen that between 1898 and 1899 the total output has increased from 202 to 220 million tons, or by about 9 per cent.; and the numbers employed, from 707,000 to 729,000, or by about 3 per cent. Owing to the great coal dispute in South Wales, the figures for some districts in 1898 were abnormal; and those for 1897 have been inserted for comparison. The increase of output in 1899 compared with 1897 is about 9 per cent., and of number employed about 5 per cent.

Districts.	Number Employed.			Total Output of Coal (in Thousands of Tons).		
	1897.	1898.	1899.	1897.	1898.	1899.
Newcastle	72,223	73,736	77,623	21,768	23,005	23,753
Durham	80,599	81,184	82,927	23,810	24,372	24,406
Yorks. and Lincs.	89,782	91,452	95,140	24,049	25,631	26,901
N. & E. Lancashire	38,945	38,732	38,965	10,439	10,897	11,034
Liverpool	54,369	53,799	54,090	15,299	16,627	16,548
Midlands	80,322	82,314	84,797	23,798	25,768	27,581
N. Staffordshire	24,639	25,272	26,404	6,434	6,652	6,799
S. Staffordshire	25,970	25,993	27,279	9,316	9,421	9,413
South Western	45,760	46,471	47,422	12,478	9,442	13,753
South Wales	92,624	94,938	97,456	25,510	19,860*	28,629
West Scotland	39,215	40,453	42,305	12,696	13,216	13,393
East Scotland	49,752	51,569	53,607	16,387	17,021	17,750
Ireland	1,013	981	993	135	130	125
Total	695,213	706,894	729,009	202,119	202,042	220,085

* Affected by prolonged trade dispute (April to September).

THE COAL CRISIS IN RUSSIA.

The difficulty experienced by a large number of gas managers in England in obtaining supplies of coal during the past winter invests with special interest the question of the supply of this material in other countries. Russia, as our readers are probably aware, has been suffering from a coal crisis; and a report thereon, and upon the main sources of native supply, has been made to the Foreign Office by Mr. H. Cooke, the British Commercial Agent in the Empire. It was issued last Wednesday as one of the series of Consular Reports; and we give the following extracts from it.

In his introduction, Mr. Cooke explains that the continuance of the coal crisis, the abnormal rise in prices, the exhaustion of available stocks, and the dearness of kindred mineral fuels, have led to the temporary relaxation or remission of the duties on foreign coal, to stern and summary measures on the part of the authorities in Poland, fixing prices and suppressing the active influence of "rings" and syndicates, and to Government Commissions now sitting to examine into, and report upon, the whole question in all its branches. He points out that as the very lifefood of all industries, and of all transport by which those industries thrive and develop, the supply of available coal, encouraged and checked in turn by artificial means, in no way corresponds to the demand that the increasing industrial activity of the country makes upon it, the more so for the reason that the coal itself is but of moderate quality; for, though the output of native coal has enormously increased of late years, the import of the foreign article has likewise steadily risen, in spite of duties, till at the present moment the import of foreign coal has become of such urgent necessity that these have had to be temporarily reduced or remitted altogether.

The mining industry, itself young, has not had time to meet the demand caused by the rapid and undisputed rise and extension of the general industrial energy of the country during the last ten years. But these industries in general are also still in their youth; so that there seems to be no prospect of the supply and demand coming more in reach of each other for some time. In the Donetz basin alone, it is estimated that this year there will be a deficit of 30,000,000 poods (483,870 tons) in the supply, as compared with the demand, and in the Dombrovski basin 20,000,000 poods (322,580 tons), or altogether close upon 1,000,000 tons. Mr. Cooke states that a host of subsidiary causes of the present scarcity, each more or less important factors in the situation, aided by speculation, are now the subject of daily contention and discussion. Before reviewing this discussion, and the measures taken by the Government to fill up the void in the supply, he surveys in general terms the main sources of native coal in Russia, and first of all shows, by a few figures, the enormous rise in the industrial movement of the country, to which the present coal crisis is chiefly attributed.

The Minister of Finance, in his Budget statement of Jan. 1, 1900, tabulates the progressive growth of the general manufacturing industry of European Russia during the last twenty years; and, exclusive of mines, the totals are as follows: The output of the manufacturing industry of European Russia in 1877 amounted to 541 million roubles; in 1887, to 802 millions; and in 1897, to 1816 millions. The average annual increase of productiveness from 1878 to 1887 was 26·1 million roubles; from 1888 to 1892, 41·6 millions; and from 1893 to 1897, 161·2 millions. In

addition to the above, taking the mining industries, we have the following outputs:—

	Millions of Poods (62 poods = 1 ton).		
	1877.	1887.	1898.
Coal	110	277	746
Naphtha	13	167	507
Pig iron	23	36	134
Iron	16	22	30
Steel	3	14	90

With this great increase in the industrial output of Russia since 1877—and particularly since 1887—we see at the same time a rapid rise in the yield of native coal, from 110,000,000 poods (1,774,193 tons) in 1877, to 746,000,000 poods (12,032,258 tons) in 1898. The output in 1899 has probably been 800,000,000 poods (in round figures, 13,000,000 tons).

At the same time, in spite of duties, there has been a continual increase in the import of foreign coal (over European frontiers)—*i.e.*, from 1,532,258 tons in 1877 to 3,161,290 tons in 1898; while the total for 1899 will doubtless be considerably larger.

The two main coal-producing centres are the Donetz basin in the south, and the Dombrovski basin in Poland. Besides these, but yielding far inferior supplies, are the Ural district (of almost illimitable possibilities), the Tula and other central provinces, the Kuznetski basin in Siberia, the Trans-Caucasian, and other districts, which, however promising, are as yet practically undeveloped.

The Donetz basin, including part of the government of Ekaterinoslav and part of the province of the Cossacks of the Don, in the south of Russia, is one of the richest in the world, with practically inexhaustible resources calculated to produce yet some 860,250,000,000 poods (13,875,000,000 tons), or, allowing for progressive output, to last for 800 years. With 254 mines, it yielded in 1897 upwards of 355,000,000 poods of coal, in addition to 59,435,600 poods of anthracite. During 1899, the increase here alone was more than 1,000,000 poods. Worked at first by numerous small companies or owners, spread in all directions, over 80 per cent. of the output now comes from 15 great mines, aided by foreign capital, mostly Belgian, which, especially of late years, has enabled work to be carried on with feverish activity, though still hindered by transport and other difficulties. The Donetz basin has to compete with Polish coal coming to Kieff, British in the Black Sea, and with naphtha fuel in the Moscow region. The coal itself is not of first-rate quality, having a high percentage of ash and sulphur, nor does it lend itself to any good kind of coke. It hardly finds as yet any extensive market abroad. In that basin the price for big coal in January, 1900, was 14 c. per pood, delivered at the nearest railway depôt. Prices have fluctuated considerably from 18 c. per pood, delivered in trucks, in 1870, to 5¾ to 6 c. in 1896; while of late the rise has been very rapid. At Odessa, during 1899, Donetz coal varied from 14 to 21 c. per pood; Glasgow-Hull, 22 to 25 c. per pood; Cardiff, 24 to 30 c. per pood; and Newcastle (till July), 25 c. per pood. Freights fluctuated between 11s. 6d. and 8s. per ton. At present (February, 1900), the price of English coal at Odessa varies from 28 c. to 30 c. per pood.

The Dombrovski basin is a continuation of the great Silesian coal basin, and covers an area of some 800 square versts. Inferior in most respects to the Donetz basin, and practically producing no coke, its output has, however, considerably increased; its 20 mines yielding 230,000,000 poods in 1897, compared with 120,000,000 poods in 1880. The basin is worked by a few great mines—20 in all—and the output is distributed over Poland, and in part finds a market in Russia.

The Ural mines are of extraordinary richness, practically inexhaustible in the amount of the possible output; but the coal is of only very moderate quality. They extend mostly along the line from Perm to Ekaterinburg. The output has risen from 10,000,000 poods in 1887, to 22,500,000 poods in 1894, and 22,000,000 in 1899—poor figures compared with the industrial needs of the district, and with the capabilities of the mines themselves. About three-quarters of the output is used up by neighbouring railways. The Ural district is immensely rich in minerals, which only need greater development, further railway extension, and more abundant and more easily accessible fuel. Though the coal here is of thin inferior quality, it has its uses; and while useless for most kinds of foundry work, it can be employed for boilers, locomotives, &c. With the extension of railway communications, this coal region and its other mineral industries will enormously develop.

Among the remaining coal-producing districts—far inferior in present yield, however, to any of the above, but with all the possibilities of a great future—is the Eskibastus, on the west bank of the Irtish, south of Omsk, containing, it is estimated, a reserve of over 200,000,000,000 poods of coal, with copper and iron ores in the neighbourhood. The coal is, however, said to be of but moderate quality. The Kusnetski basin, in the government of Tomsk, Siberia, which the Siberian Railway will help to develop, the Tula and central districts of European Russia, and the Caucasian (Tkvibulski) district—all with very moderate yields—are the remaining coal regions of Russia worth mentioning.

Returning to the present coal crisis, Mr. Cooke states that the following are among the temporary measures taken by the Government to ward off the effects of the general scarcity: Odessa has been authorized to import 6,000,000 poods (96,774 tons) of foreign coal for household purposes at a reduced rate of duty (1½ c. instead of 6 c. per pood) till Jan. 1/14, 1901; and similar reductions have been made at other ports of the Black Sea and Sea of Azov for fuel for steamers, &c. The free import of foreign coal has been authorized for the needs of the population of Warsaw, as also for all the Russian railways till Sept. 1/14 next for railway uses only. At Warsaw, wholesale dealers have been summarily ordered, under heavy penalties, not to keep prices above 1 r. 15 c. the korzec of 6 poods; while it is stated that seventeen of the largest dealers have been placed under police supervision. The result, in general, has not been entirely successful; and the Government have had to send across the frontier for Silesian coal, and been unable to obtain it, owing to transport difficulties, as well as to want of surplus supplies there. A Government Commission has been sitting for some time at St. Petersburg to inquire into the whole question of the coal supply and demand, more with a view to organic measures than to any permanent relaxation or remission of duties or other temporary expedients.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 793.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 13	10½	Alliance & Dublin 10 p. c.	20½—21½	..	4 17 8
100,000	10	,,	7½	Do. 7 p. c.	14—15	..	5 0 0
800,000	100	Jan. 2	5	Australian 5 p. c. Deb.	100—102	..	4 18 0
200,000	5	Nov. 15	6	Bombay, Ltd.	6½—6¾	..	4 8 11
40,000	5	,,	6	Do. New, £4 paid	4½—4¾	..	5 1 1
880,000	Stk.	Feb. 23	12	Brentford Consolidated	267—272	..	4 8 3
270,000	,,	,,	9	Do. New	203—208	..	4 6 7
50,000	,,	,,	5	Do. 5 p. c. Pref.	140—145	..	3 9 0
159,375	,,	Dec. 14	4	Do. 4 p. c. Deb.	118—123	..	3 5 1
220,000	Stk.	Mar. 14	11½	Brighton & Hove Orig.	250—255*	..	4 10 2
226,320	,,	,,	8½	Do. A. Ord. Stk.	180—185*	..	4 11 11
999,500	Stk.	Feb. 23	5	Bristol, 5 p. c. max.	125—130	..	3 16 11
420,000	20	Sept. 29	10	British	42½—43½	−½	4 11 11
50,000	10	Feb. 23	12	Bromley, Ord. 10 p. c.	24—26	..	4 12 4
79,000	10	,,	9	Do. 7 p. c.	19—21	..	4 5 8
500,000	10	Oct. 13	6	Buenos Ayres (New) Ltd.	9¾—10¼	..	5 17 1
220,000	Stk.	Dec. 29	4	Do. 4 p. c. Deb.	99—101	..	3 19 3
150,000	20	Mar. 14	8¼	Cagliari, Ltd.	25—27*	..	6 2 3
100,000	10	Sept. 29	8	Cape Town & Dis., Ltd.	15—16	..	5 0 0
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	56—58	..	5 3 5
550,000	Stk.	Oct 13	13½	Commercial Old Stock	305—310	..	4 7 1
200,750	,,	,,	10½	Do. New do.	240—245	..	4 5 9
200,750	,,	Dec. 14	4½	Do. 4½ p. c. Deb.	142—145	..	3 2 1
800,000	Stk.	Dec. 14	9	Continental Union, Ltd.	170—180	..	5 0 0
200,000	,,	,,	7	Do. 7 p. c. Pref.	178—183	..	3 16 6
51,600	Stk	Feb. 23	14	Croydon A 10 p. c.	335—340	..	4 2 4
173,400	,,	,,	11	Do. B 7 p. c.	265—270	..	4 1 5
555,000	Stk.	Feb. 23	5½	Crystal Palace Ord. 5 p. c.	122—127	..	4 2 8
60,000	,,	,,	5	Do. 5 p. c. Pref.	132—137	..	3 13 0
486,090	10	Jan. 26	11	European, Ltd	20—21	..	5 4 9
354,060	10	,,	11	Do. £7 10s. paid	15—16	..	5 3 2
14,933,075	Stk.	Feb. 9	4½	Gas-light & Coke	4 p. c. Ord.	104—106	+1	4 12 5
2,900,000	,,	,,	3½		3½ p. c. max.	97—99	..	3 10 8
3,799,735	,,	,,	4		4 p. c. Con. Pref.	119—122	..	3 5 7
3,933,975	,,	Dec. 14	3		3 p. c. Con. Deb.	99—101	..	2 19 5
70,000	10	Nov. 15	8	Hongkong & China, Ltd.		13½—14½	..	5 10 4
3,800,000	Stk.	Nov. 15	10	Imperial Continental		211—214	−2	4 13 6
473,600	Stk.	Feb. 9	3½	Do. 3½ p. c. Deb. Red.		100—103	..	3 8 0
75,000	5	Dec. 14	6	Malta & Medn., Ltd.		4½—5½	..	5 9 1
550,000	100	Oct. 2	5	Met. of Melbourne	5 p. c. Deb.	110—114	..	4 7 9
350,000	100	,,	4½		4½ p. c. Deb.	107—109	..	4 2 7
541,920	20	Nov. 15	3	Monte Video, Ltd.		11—12	..	5 0 0
667,946	Stk.	Feb. 23	9½	Newc'tle & Gatesh'd Con.		215—220	..	4 4 1
299,855	Stk.	Dec. 29	3½	Do. 3½ p. c. Deb.		104—107	..	3 5 5
60,000	5	Feb. 23	7	Ottoman, Ltd.	Ex d v.	4¾—5¼	..	6 13 4

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
150,000	5	Nov. 30	8	Oriental, Ltd.	7—7½	..	5 6 8
135,000	5	,,	8	Do. New, £4 10s. pd.	6½—6¾	..	5 6 8
15,000	5	,,	8	Do. do. 1879, £1 pd.	1¼—1¾	..	4 11 5
500,000	100	Dec. 1	6	People's Gas of Chicago 2nd Mtg. Bonds	102—106	..	5 13 2
851,070	10	Oct. 13	7	River Plate Ord.	11¼—11¾	..	5 19 2
250,000	Stk.	Dec. 29	4	Do. 4 p. c. Deb.	100—102	..	18 5
250,000	10	Sept. 15	10	San Paulo, Ltd.	12—13	..	7 13 10
135,000	Stk.	Sept. 15	10	Sheffield A.	249—251	..	3 19 8
209,053	,,	,,	10	Do. B.	249—251	..	3 19 8
447,427	,,	,,	10	Do. C.	249—251	..	3 19 8
5,600,000	Stk.	Feb. 23	5½	South Metrop., 4 p.c. Ord.	135—138	..	3 17 3
1,520,000	,,	Jan. 12	3	Do. 3 p. c. Deb.	100—102	..	2 18 10
120,000	Stk.	Mar. 14	6	Tottenham and Edmonton	A. 5 p.c.	159—141*	..	4 5 1
250,520	,,	,,	4½		B. 3½ p.c.	100—102*	..	4 8 3
55,100	,,	Dec. 14	4		4 p. c. Deb.	113—117	..	3 8 5
182,380	10	Jan. 12	5	Tuscan, Ltd.		8½—9½	..	5 5 3
149,900	10	Jan. 2	5	Do. 5 p. c. Deb. Red.		101—104	..	4 16 2
				WATER COMPANIES.			
780,399	Stk.	Dec. 29	11	Chelsea, Ord.		307—312	..	3 10 6
150,000	,,	,,	5	Do. 5 p. c. Pref.		157—162	..	3 1 9
160,000	,,	,,	4½	Do. 4½ p. c. Pref. '75		145—150	..	3 0 0
175,785	,,	Sept. 29	4½	Do. 4½ p. c. Deb.		148—153	..	2 18 10
1,720,560	Stk.	Oct. 13	7	East London, Ord.		205—210	..	3 6 8
654,740	,,	Dec. 29	4½	Do. 4½ p. c. Deb.		145—150	..	3 0 0
390,000	,,	,,	3	Do. 3 p. c. Deb.		99—101	..	2 19 5
700,000	50	Dec. 14	7½	Grand Junction 10 p. c. max.		108—110	..	3 8 2
310,000	Stk.	Sept. 29	4	4 p. c. Deb.		131—136	..	2 18 10
708,000	Stk.	Feb. 23	1¼	Kent		308—313	−4½	4 9 5
160,000	,,	,,	7	Do. New, 7 p. c. max.		200—210	..	3 6 8
1,043,800	100	Dec. 29	10½	Lambeth, 10 p. c. max.		295—300	..	3 10 0
406,200	100	,,	8	Do. 7½ p. c. max.		215—220	..	3 12 9
350,000	Stk.	Sept. 29	4	Do. 4 p. c. Deb.		132—115	−3	2 19 3
500,000	100	Feb. 23	13½	New River, New Shares		420—425	..	3 3 6
1,000,000	Stk.	Jan. 26	4	Do. 4 p. c. Deb.		132—137	..	2 18 5
902,300	Stk.	Dec. 14	7½	South-wark and	Ord.	203—205	..	3 13 2
126,500	100	,,	7½		7½ p. c. max.	190—195	..	3 16 11
489,200	Stk.	,,	5		5 p. c. Pref.	160—165	..	3 0 7
1,019,585	,,	Oct. 13	4	Vauxhall	4 p. c. A Deb.	131—136	..	2 18 10
1,155,066	Stk.	Dec. 14	10	West Middlesex		288—293	−2	3 8 3
200,000	,,	,,	4½	Do. 4½ p. c. Deb.		147—152	..	2 19 3
200,000	,,	Mar. 14	8	Do. 3 p. c. Deb.		99—101*	..	2 19 5

*Ex div.

Dealing with the causes of the scarcity, Mr. Cooke says that, while the undoubted rise and development of late years in the industrial activity of Russia, and the extension of railways and navigation, have been perhaps the chief, they are by no means the only explanation of the present scarcity and high prices of coal. The coal mining industries themselves are not developed enough to meet the demand, in spite of an increasing output and of a protective tariff; while insufficient railway accommodation, difficulties of delivery, and generally defective transport arrangements play an important part in the situation. Another consideration is the dearness of naphtha and kindred fuels preceding the rise in coal prices. The activity of syndicates and "rings," by limiting production and bringing up prices, and the universal speculation and gambling attending of late the coal and other industries of Russia, are equally important factors, against which the Government have taken, as shown above, summary administrative measures—at least as regards coal. In the Dombrovski basin, the second largest coal-producing district of Russia, the mines at work are distributed among 15 or 16 owners, five of whom, it is said, produce 86 per cent. of the whole annual yield—a condition which could easily lend itself to irregularities; while wholesale dealers on their part, in a trade which in every country seems peculiarly to lend itself to abuses, could hardly fail to take advantage of the scarcity, or to promote it, so as, by limiting the stocks available, to get full command of the market, and work prices upwards to the desired point. By the end of December, dealers at Warsaw had raised prices to 225 r. the load of 660 poods, while it cost them only 100 r. The Government now force them to sell at prices not higher than 115 r. the load. The action of the railway companies, forcing the collieries to provide at original or only slightly increased prices, under previous agreements, irrespective of scarcity, has had a considerable bearing on the crisis. Other subsidiary causes, which are said to have more or less influenced the situation, have been the want of hands, the rise in wages, the decrease of hours, and the superabundance of national and religious holidays—to an extent, however, which has been much disputed. Others see nothing specially local in the state of the market, but attribute it to the more or less corresponding scarcity elsewhere, and other external causes, such as the war in South Africa. The non-use of naphtha as fuel for warming purposes, even in the Baku and other regions where it is comparatively cheap, is also brought forward; tradition and fear of dangerous results, besides a somewhat complicated apparatus, rendering hard fuel more popular to the ordinary mind.

With regard to remedies, Mr. Cooke says the Government have already, with more or less success, by temporary relaxations or remissions of duties on foreign coal, and by stern administrative measures against the action of syndicates and speculation in general, provided for the present. These are, however, but temporary expedients, not touching the heart of the matter; and it is universally recognized that organic changes and improvements all round, at the mines and in the means of transport, have become urgently necessary. There is an inexhaustible supply of coal in Russia as yet undeveloped. True, it is generally of somewhat inferior quality. While one or two papers boldly propose the permanent abolition of duties on foreign coal and coke—protesting that by fifteen years of protection the authorities have systematically ignored the interests of consumers, and helped thereby to devastate the forest riches of Russia—the Government itself, by the mouth of the President of the Commission now investigating the whole subject, emphatically declared at the first meeting that the question of the remission of duties could not enter into the programme of discussion at all. Others propose, as the only remedy, that the State itself, as a great railway owner, should have its own mines and work the railways from them.

COUNTY COUNCILS AND WATER SUPPLIES.

At the Annual Meeting of the Northumberland County Council, the Parliamentary Committee reported that they had adopted the following report of a Sub-Committee appointed in regard to the future water supply of the country: In the opinion of the Sub-Committee, a Royal Commission should be appointed for the purpose of taking evidence and reporting on the practicability and advisableness of—(1) Assimilating the law relating to percolating water with that relating to water in a defined channel, so as while adequately safeguarding the interests of others, to afford at least some protection to well owners and other persons interested in percolating water. (2) Determining the principles which should usually guide Parliament in conferring exceptional local powers on Corporations and water companies, with special regard to the sources of supply available to the particular Corporation or company. (3) Establishing with large powers a water authority in each county, or group of counties where the counties are small, or where there are more than one county dependent, or likely to be on the same source of supply.

At the meeting of the Water Committee of the St. Helens Corporation on the 14th inst., the Town Clerk (Mr. G. W. Bailey) reported that he had attended, on behalf of the Corporation, the Special Committee of the Association of Municipal Corporations, called to confer with the representatives of the County Councils on a suggestion that there should be an amendment of the law enabling the Councils to have some control over the pumping of water in the case of collieries and other authorities obtaining a supply from deep wells. The representatives of the Councils gave illustrations of various cases in which surface water supplies had been interfered with by colliery sinkings and by pumping; and they thought the condition of things demanded some action by Parliament. It was pointed out to them, however, that many boroughs derived their supply from deep wells; and they thought that, so far as Corporations were concerned, the rights of the counties were sufficiently protected. It was also intimated that they would not be prepared to support any action which would result in the authorities of large towns being more hampered than they now were in the field of water supply. If power were put into the hands of County Councils to veto local authorities, the Councils would be able to extort unreasonable terms from large towns. In the end, the representatives of the County Councils agreed to formulate their ideas, not excluding the local authorities of the towns or boroughs from the powers, at any rate making them apply in a modified form; and these ideas were to be submitted to a subsequent meeting of the Association.

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History of the Water-Works.

Before the members of the Oldham Municipal Officers' Guild, Mr. C. J. Batley, the Manager of the Corporation Water-Works, recently delivered a lecture on the undertaking of which he has charge. He commenced by enlarging on the necessity of a big manufacturing town like Oldham having an ample supply of pure water available for domestic, trade, and sanitary purposes, and then proceeded to give a history of the water-works from the time when the town was supplied by a private Company. The first works to be constructed were the Strinesdale reservoirs, which are partly within the borough—the upper reservoir being constructed in 1825, and the lower one in 1838; their storage capacity together being 216 million gallons. At this time, when the lands draining into the reservoirs were in a low state of cultivation, and the science of bacteriology as applied to the examination of water was unknown, the quality of the supply was unquestioned by the then consumers, so long as the commodity was not what is termed "meat and drink." Modern science, however, and a greater regard for the public health, have compelled the abandonment of these sources of supply; and the two reservoirs named are now solely used for storage, and are supplied by the surplus water from Castleshaw. In 1853 the water-works were acquired by the Corporation; and shortly afterwards parliamentary powers were obtained for the fine series of reservoirs in the Piethorn Valley, including Norman Hill, Piethorn, and Kitcliffe, as well as the Brushes Clough and Besom Hill reservoirs. In 1865 the powers for the construction of the Hanging Lees reservoirs, and in 1870 for the Ogden reservoir, were obtained. By subsequent powers obtained in 1886, the last-named reservoir was enlarged; and the Rooden reservoir, approaching completion, was constructed. The capabilities of this valley, which contains six reservoirs, are now exhausted. These reservoirs will store 961 million gallons of water from a drainage area of 1820 acres. Parliamentary powers for their construction were not obtained without great opposition. Millowners who are on the stream below the reservoirs have to be compensated by supplying them with one-third of the available rainfall, which must be stored and sent into the stream in regular quantities at certain times to be fixed by them. This compensation is one of the penalties which the Corporation have to pay for the privilege of abstracting a portion of the waters of this valley for the use of the town. In 1876 the construction of the four Denshaw reservoirs was commenced, with a storage capacity of 381 million gallons. These works were utilized for the service of the town in 1883, and were no sooner completed than, owing to the rapid increase in the population in the district of supply, it was found necessary to take steps to further augment the resources of the undertaking, and find new areas of supply. In 1886 powers were obtained for the construction of the Castleshaw works. This scheme provided two reservoirs, with a storage capacity of 289 million gallons. The surplus clean water from this drainage area of 950 acres is conveyed by a line of pipes 30 inches in diameter for 4½ miles, passing under Highmoor in a tunnel 1½ miles in length.

Having given a brief historical sketch of the water undertaking, the lecturer proceeded to explain the system adopted in the design and working of the reservoirs. They stand one above another, enabling the flood or turbid waters to be retained separately in the higher reservoirs and decanted down to the lower ones when sufficiently clarified; thus oxidizing, aërating, and ensuring constant change in the water, which helps to keep down to a minimum the growth of plant life, and breaks up the organic matter contained in it. This system allows practically the whole of the flood waters to be stored for domestic consumption; thereby utilizing to its fullest extent the resources of the drainage areas. Owing to the peaty character of the Oldham watersheds, the rainfall gathers a certain proportion of colouring matter from it; but by exposure to light and air, coupled with the drainage system adopted, the colour is bleached, and the water when supplied to the consumers is second to none as a good potable water. Means are also now being taken to prevent the water from becoming contaminated with lead when passing through the service-pipes. In the collection of the waters to be eventually distributed, the greatest care has to be given. Flood waters have to be diverted at the proper times—frequently in the middle of the night. Wreck lodges (small reservoirs constructed on the various streams, to allow any matter in suspension to precipitate) have to be regularly cleansed; and as these are very numerous, the work entailed is considerable. Drains, of which there are hundreds of miles, have to be cleansed of vegetable growth and extraneous matter. At present a population of about 235,000 persons, each consuming from 20 to 25 gallons of water per day, is being furnished with a constant supply. To do this, iron pipes of large diameter are laid from the reservoirs to the town; and the total quantity delivered is registered by meters fixed near the works.

In concluding, the lecturer expressed the hope that such a thing as a water famine might never afflict the town, and that Oldham might in the future, as in the past, be able to boast that she possesses a water supply second to none in the kingdom for purity and abundance.

The New Gas-Works for Brussels.—The daily productive capacity of the Brussels Gas-Works (about 5½ million cubic feet) is being doubled by the construction of second works the size of the present ones; and they are expected to be opened in July. As far as equipment is concerned, mechanical appliances of the latest kinds will be employed, and they will be operated by electricity; the dynamo being of 1200-horse power. The unloading of the coal vessels, the charging and drawing of the retorts, and the conveyance, stacking, and bagging of the coke, will all be done by machinery.

The Costs of Promoting and Opposing Water Bills for Newhaven and Seaford.—A Joint Committee of the Newhaven and Seaford District Councils has been discussing the manner in which payment should be made of the bill of costs incurred in promoting and opposing Water Bills in 1898-99. The amount which the two towns will have to provide is £4925; and this is to be equally divided between them. The Committee recommended the Councils to apply to the Local Government Board for a loan, the repayment of which it is hoped to extend over ten years. The Committee's proposal has been adopted by both bodies.

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NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

On Monday last, the Edinburgh and Leith Gas Commissioners held their annual statutory meeting, which was presided over by Provost Mackie, of Leith. The report of the Engineer (Mr. W. R. Herring) showed an increase in the output of gas during February, as compared with February of last year, of 14½ million cubic feet, and an increase since May 16 of nearly 82 million cubic feet. The cost of coal per 1000 cubic feet of gas is now a little over 2d. more than it was a year ago. There has been an increase in the number of gas-cookers on hire since May 16, of 856. Referring to the output of gas, Mr. Kinloch Anderson said that the normal increase was being maintained. Some people, he remarked, thought it was getting a very common phrase to hear of an increase every time; but it continued all the same, and he was very pleased that it did so. On the recommendation of the Works Committee, the Clerk (Mr. J. M'G. Jack) was instructed to advertise for tenders for coal, oil, lime, and other stores. Mr. Kinloch Anderson said that in respect of the coal and oil stores, the offers would be asked both for six months and for twelve months. They could then accept either one or the other. This method of tendering might be to the advantage of the Commission; it certainly could not be to their disadvantage.

With reference to the Edinburgh Corporation Bill, which I observe was before a Committee of the House of Lords yesterday, the Finance and Law Committee reported that they had considered the petitions against the Edinburgh Extension Bill, and the possibility of the Corporation and the Duke of Buccleuch arranging for the inclusion within the city boundaries of the foreshore and Shore Road at Granton, on which foreshore the Commissioners have right of tipping refuse, &c., and on which road there are railway lines over which the Commissioners have right of running traffic for a nominal sum, which rights largely influenced the Commissioners in acquiring the ground at Granton, and which inclusion would give the Corporation right to regulate the traffic, and might cause the Commissioners very serious loss and trouble. The Committee asked power to watch the progress of the Bill in the First House, with the view, if necessary, of petitioning against it in the Second House. This was agreed to; and in accordance with the resolution, a deputation of the Commissioners have been in London all the week. It is almost useless to write of this matter now, because by next year such inquiries will be held in Scotland; but it will not be out of place to point out that, if it had not been for this practice of compelling public men to hang on at Westminster for unconscionable periods of time, there might never have been any demand for local inquiries. Committees having five or six Bills relegated to them, put them all out together; and everyone, from the uttermost parts of the realm, requires to be present, as it is impossible to tell when their turn may come. I suppose that officials, who consider themselves overworked, are responsible for the crowding of these bothersome inquiries into as short a space of time as possible; and the Committees, also desirous of getting through with their work, silently acquiesce. It surely should be possible to put out the applications on definite days. In this case, I see that the inquiry has been postponed till Monday, which means to all the parties interested either the fatigue of a double journey between London and Scotland, or the loss of another day (to-day). Would it not have been better, about the middle of the week, to have arranged to open the inquiry on Monday? Then everyone could have returned to Scotland, which, in the words of Mr. Kinloch Anderson, might have been to their own advantage, and would certainly not have been to their disadvantage.

In the evening, the annual dinner of the Commissioners was held in the Balmoral Hotel—Provost Mackie again in the chair; the Lord Provost of Edinburgh being in London. Of late years, the gathering has resolved itself into a social function—all speaking, except in the proposing of the loyal toasts, being eschewed. The proceedings are, in consequence, rendered more pleasant. They were particularly so this year; and I desire to make mention of the excellent qualities of head and heart of the Chairman, as being the most important element contributing to the enjoyment of the evening.' Provost Mackie has a happy method of dispatching business; and when pleasure is the billet on the programme, he is equally at home. His appointment as a Chief Magistrate is a distinct aquisition to the public life of Scotland.

While at one time I was disposed to look with a critical eye upon the sayings and doings of Bailie Mackenzie, of Edinburgh, in matters electrical, I have lived to learn that he is a gentleman who does not speak without book. He has done more to popularize electricity than any other public man in Scotland; and his reward, as yet, is the knowledge that the installation he controls stands first in the United Kingdom in more respects than one. It will be information to most to learn that he originally undertook the work with reluctance, at the urgent request of the then Lord Provost (Sir James Russell). When he did undertake it, he took it up in no half-hearted manner. Whatever he says upon electricity is interesting; and that is the reason why I give one or two quotations from his latest utterance on the subject, which was an address before the Edinburgh Association of Science and Art this week. He said that "during the nineties the progress of electric lighting companies and corporations had been very great; and at present six millions were invested in electric lighting in London, and about eight millions in the provinces. In London, the companies had a capital of five millions, as against three-quarters of a million claimed by the local authorities; while in the provinces the positions were reversed, the local authorities having a capital of over six millions and the companies less than two millions. . . . . The weak point in all purely electric lighting was the impossibility of having storage, in the proper sense of the term—for the so-called storage batteries were hardly worthy of the name. They might be necessary; but they were neither desirable nor economical. In the absence of a system of storage, the drawback was that machinery must be provided for the highest load, though this might only be for half-an-hour in the 24. Not only machinery, but a staff must be kept in waiting for that half hour during the other 23½ hours. If, then, a reasonably long demand for current could be obtained in other directions than

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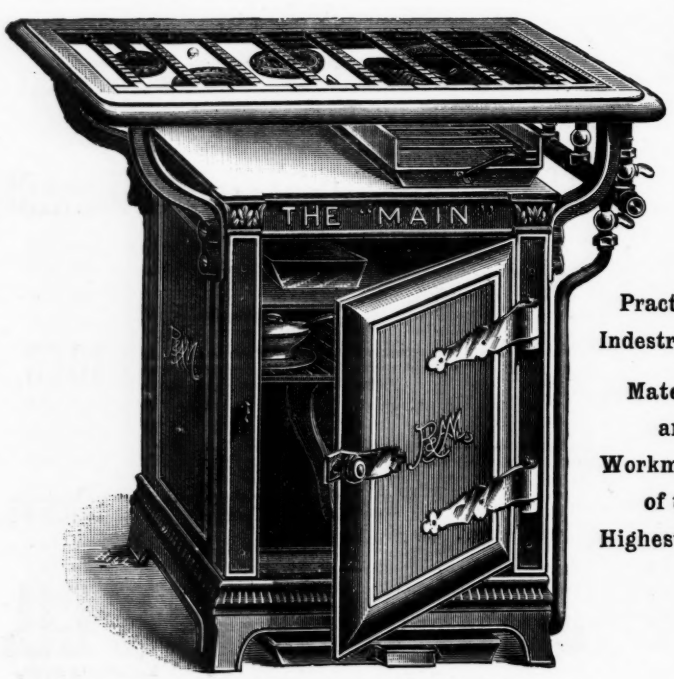

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lighting, a very low charge might prove profitable to the undertakers; while to many users the benefits would be equally great. For instance, suppose they had in Edinburgh electric traction supplied by the current from the present electric mains, personally he would be inclined to sell the necessary current for 1d. per unit, from which a profit of 30 or 40 per cent. could be made. He had many a hard struggle in the Town Council to persuade some of his friends that, while the cost of the energy at the start of the undertaking was 8d. per unit, they should sell at 6d. so as to get a large output as soon as possible. To this policy of selling cheap with a large turnover, he attributed to a large extent the position of Edinburgh in the electric lighting undertakings of the country. . . . Although it was a difficult matter to judge of the light from a particular burner or a particular lamp, electric lighting at 4½d. per unit, he thought, was about equal, light for light, to gas at 3s. per 1000 cubic feet burned in an ordinary flat-flame burner. Of course, if the gas was burned in an incandescent burner, electric lighting would not stand the comparison. But at the same time, if this were done, the upkeep of the mantles, which were exceedingly fragile, should be taken into account; and probably for a lengthened period the difference would not be at all so great as at first sight appeared." Apropos of the opening sentences of this paragraph, I may say Bailie Mackenzie has also shown that he has the capacity of learning as he goes along. He has considerably modified his views as to gas supply, and now no longer speaks as if it were a thing which is likely to become obsolete. It will be observed that he frankly admits the superiority of incandescent gas lighting. His opinion as to the relative cost of gas and electric lighting is one from which anyone may differ. I do not accept his view. I consider that a No. 4 Bray gas-burner gives a great deal more light than a 16-candle electric lamp gives when it is new, not to speak of when it is a few months old. A No. 4 Bray burner, with gas at 3s. per 1000 cubic feet, will, in 2000 hours, consume gas to the amount of £1 4s.; a 16-candle electric lamp will, in the same time, consume 2000 units, which, at 4½d. per unit, amounts to £2 6s. 10½d. So much for that "opinion." His remarks about the difficulties attending the question of storage may be commended to the notice of electricians everywhere.

The trial of the action by Mr. Christie against Mr. Craik, both members of the Corporation of Forfar, in which £1000 was sued for as damages for slander, took place in Edinburgh this week, and resulted in the pursuer getting one farthing damages. The utterances complained of had reference to transactions in hay and straw; but the animosity which led up to the accusations being made, was said to have begun in 1891, when Mr. Craik was Convener of the Gas Committee, and Mr. Christie, during the election, alleged that the gas-works were being mismanaged. Mr. Christie stated in the witness-box that Mr. Craik changed his attitude towards the Gas Manager in 1897; and the Gas Manager came to him asking his protection. It is well known that Mr. Craik, from being the champion of the Gas Manager, became one of his severest critics, both in public and in private. The trial revealed a wretched state of matters. Mr. Christie is a frequent fault-finder; and when he does so, he contrives to throw an amount of bitterness into his complaints which has an exceedingly irritating effect. This is very bad, in my opinion; but it does not justify a colleague, albeit that he may lose his temper, calling a public meeting to refute Mr. Christie, and at that meeting "before God and man" charging him with making a profit of a farthing per stone of hay or straw which the Corporation had purchased. Mr. Craik must learn to keep his temper, even although he should be nagged.

The Police Board of Greenock had before them this week the report of the Manager upon the tenders received for charging and drawing machinery at the gas-works, a high-level railway, coal-breaking plant, and other extensions of gas plant. Tenders were accepted to the amount of about £8000.

As I write, the evening newspapers announce a fire as in progress at the ammonia works in the Shotts Iron-Works. The imagination of the reporter has discovered that several explosions have occurred, and that there is, in consequence, a great panic among the inhabitants of the place. He gives it as the scrubber which is on fire; but in this he must be mistaken. He adds that as no means can be employed to extinguish the fire, all the workmen have deserted their work, fearful of a terrible explosion taking place. The reporter does not know, but surely in the works they must be aware that there is nothing which so soon extinguishes fire as ammoniacal liquor. Even a fire in a tar-tank has been extinguished by it. So far, then, from there being no means for extinguishing the fire, the probability is that the most effective instrument for dealing with it was close at hand.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March* 24.

Sulphate of Ammonia.—The market has been quiet throughout the week; and values have been irregular—the closing quotations being nominally £12 to £12 2s. 6d. per ton f.o.b. at the ports. Continued severe weather is delaying agricultural operations both at home and on the Continent; and buyers have consequently been able to postpone their further purchasing, so that direct orders have been scarce. Hence buying has been left mainly to middle men; and parcels offered have only been disposed of at a decline. Deliveries on contracts, however, continue on a satisfactory scale. There is still very little interest in the forward position; and, makers being firm, no important first-hand business is reported.

Nitrate of Soda is also quiet, and for the same reason; and spot quotations have declined to 8s. 9d. per cwt. for ordinary and 8s. 10½d. for fine quality.

LONDON, *March* 24.

Tar Products.—Benzols are very flat indeed; and business has fallen off seriously during the last week. Lower prices are being offered; and the outlook is discouraging. Owing to the much higher rates being asked for carrying sea-borne pitch, the market value of this article f.o.b. is marked lower. The large advance in freight is likely to seriously impede business. Solvent naphtha is dull; and creosote and tar oils are not quite so firm. High prices are being paid for tar, prices which

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COLCHESTER	300,000	COLCHESTER (Second Contract)	300,000
BIRKENHEAD	2,250,000	YORK	750,000
SWINDON (New Swindon Gas Co.)	120,000	ROCHESTER	500,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	KINGSTON, ONT.,	300,000
WINDSOR ST., BIRMINGHAM (Second Cont.)	2,000,000	CRYSTAL PALACE DISTRICT	2,000,000
HALIFAX	1,000,000	DULUTH, MINN.	300,000
TORONTO	250,000	CATERHAM	150,000
OTTAWA	250,000	LEICESTER	2,000,000
LINDSAY (Remodelled)	125,000	ENSCHEDE (HOLLAND)	150,000
MONTREAL	500,000	BUENOS AYRES (RIVER PLATE CO.)	700,000
TORONTO (Second Contract; Remodelled)	2,000,000	BURNLEY	1,500,000
BELLEVILLE	250,000	KINGSTON-ON-THAMES	1,750,000
OTTAWA (Second Contract)	250,000	ACCRINGTON	500,000
BRANTFORD (Remodelled)	200,000	TONBRIDGE	300,000
ST. CATHERINES (Remodelled)	250,000	STRETFORD	500,000
KINGSTON, PA.	125,000	OLDBURY	300,000
PETERBOROUGH, ONT.	250,000	TODMORDEN	500,000
WILKESBARRE, PA.	750,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000

some members of the trade consider higher than the present value of products will warrant. Anthracene is moderately firm, with more inquiry.

To-day's values may be taken as: Tar, 17s. 6d. to 27s. 6d. Pitch, east coast, 37s.; west coast, 34s. Benzol, 90's, 6d.; special qualities for gas, 8d.; 50's, 9d. Toluol, 90's, 1s. 1d.; pure, 1s. 9d. Solvent naphtha, 1s. 1d. Crude, 30 per cent., naphtha, 4d. Heavy naphtha, 10d. Creosote, 2¼d. to 3¼d. Heavy oils, 3½d. Carbolic acid, 50's, 2s. 1½d.; 60's, 2s. 6d. Naphthalene, 45s. to 70s. Anthracene, "A," 4d.; "B," 2½d.

Sulphate of Ammonia.—There is an absence of briskness in this market, largely due to makers being well sold, and not interested in dealers' moves to depress price. There is no important fresh business noted. For forward delivery, a shade less than the price quoted would secure contracts. The average value at the moment may be taken to be £12 to £12 2s. 6d., less 3½ per cent., all U.K. ports.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—No further change can be reported with regard to the position of the coal trade throughout this district, beyond what was stated last week. The only descriptions of fuel that do not meet with a demand more than sufficient to take away the present output are the better qualities of round coal, which, of course, are now beginning to hang somewhat owing to the lessened requirements for house-fire consumption. From some outside districts, supplies of round coal, and here and there also of engine fuel, are perhaps coming in more freely, and could be bought in isolated cases at lower figures; but this in no way affects Lancashire collieries, which have no difficulty in moving away all their output at the full list rates. These remain on the basis of 14s. 6d. to 15s. 6d. per ton at the pit for best Wigan Arley, 13s. to 14s. for Pemberton four-feet and seconds Arley, 12s. 6d. for steam and forge coals, and 9s. 6d. for medium to 10s. 6d. for best sorts of engine fuel. For shipment, the demand has not been quite so pressing. There is, however, still an active inquiry; and though the special prices recently ruling are not now being obtained, high figures are readily paid to secure supplies. The principal Lancashire collieries largely connected with the shipping trade have come to a unanimous decision not to quote less than 16s. per ton for steam coal delivered at the Garston Docks, the High Level, Liverpool, or the Manchester Ship Canal—either on current sales or for contracts. It is probable that the Lancashire coke makers will early next month further raise their list rates, as they have no difficulty in entering new contracts at an advance on the present basis, which represents about 23s. to 23s. 6d. per ton for ordinary furnace cokes, to 30s. and 31s. for best foundry qualities at the ovens.

Northern Coal Trade.—There is an improved tone in the coal trade, though not equally shown in all its branches. The collieries are now working fully; and the foreign demand is so large that it does not seem to be materially checked by the relatively high prices that are asked for gas, coking, and steam coals. For best Northumbrian steam coals, the price quoted is about 18s. 6d. per ton f.o.b., second-class steam are about 17s., and steam smalls 11s. to 11s. 6d. In the gas coal trade, there have been several contracts closed for Continental companies; and in one case, for delivery at Stettin, the price left is from 16s. 4d. to 16s. 6d. per ton f.o.b. for best Durham gas coals, after making allowance for the current rates of freight, &c. There is a disposition on the part of the owners of some gas coal collieries to ask higher prices, both for contracts and for occasional cargoes. There is a strong demand for gas coke, as well as for coke for foundries and blast-furnaces. The latter is priced at about 27s. per ton at the Teesside furnaces. Gas coke varies considerably in price; but the contracts that have been made show substantial advances on their predecessors. For export, gas coke may be quoted at about 16s. per ton f.o.b.; but the price fluctuates.

Scotch Coal Trade.—An easier feeling is beginning to be experienced. One large colliery in the Lothians has voluntarily announced a reduction in price of 2s. per ton. This was the first appreciable break in prices; and it has weakened the market. While this is so, both output and demand continue to be very heavy; and the rapidly rising exports show to what a large extent Scotch coalowners this year hold foreign contracts. The prices quoted are: Main 14s. to 14s. 3d. per ton f.o.b. Glasgow, ell 15s. 3d. to 16s., and splint 14s. 6d. to 15s. The shipments for the week amounted to 201,714 tons—an increase of 5411 tons upon the preceding week, and of 72,028 tons upon the corresponding week of last year. For the year to date, the total shipments have been 1,981,025 tons—an increase of 489,911 tons over the same period of last year.

Windsor Royal Gas Company.—The half-yearly meeting of this Company was held on the 16th inst.—Mr. Alderman Hollis in the chair. In their report, the Directors expressed regret at the loss of the Chairman (Sir G. H. Long), whose services had been of great value to the Company. With regard to the working, the quantity of gas consumed was practically the same as it was in the second half of 1898; the 2 million cubic feet then supplied for the public lighting being now used by private consumers. The accounts accompanying the report showed a balance of £5483 to the credit of the profit and loss account; and dividends at the rates of 5, 10, and 7 per cent. per annum were recommended. This was agreed to.

Monte Video Water-Works Company, Limited.—The report of the Directors of this Company for the year 1899 states that the gross revenue amounted to £79,636; being an increase of £2943, as compared with the previous twelve months. The working expenses decreased by £529; and the net revenue consequently showed an improvement of £3471; being £51,482 against £48,010. After paying interest and other charges, and providing £4000 for depreciation of old meters and fittings, there remains an available balance of £26,972 at the credit of the profit and loss account. An interim dividend of 2½ per cent. was paid on the 1st of November; and the Directors recommend a further dividend of 2½ per cent. (making 5 per cent, for the year, tax free)—carrying forward a balence of £6972. The Company's relations with the Government have been satisfactory; and the Executive have been paying the accounts with regularity.

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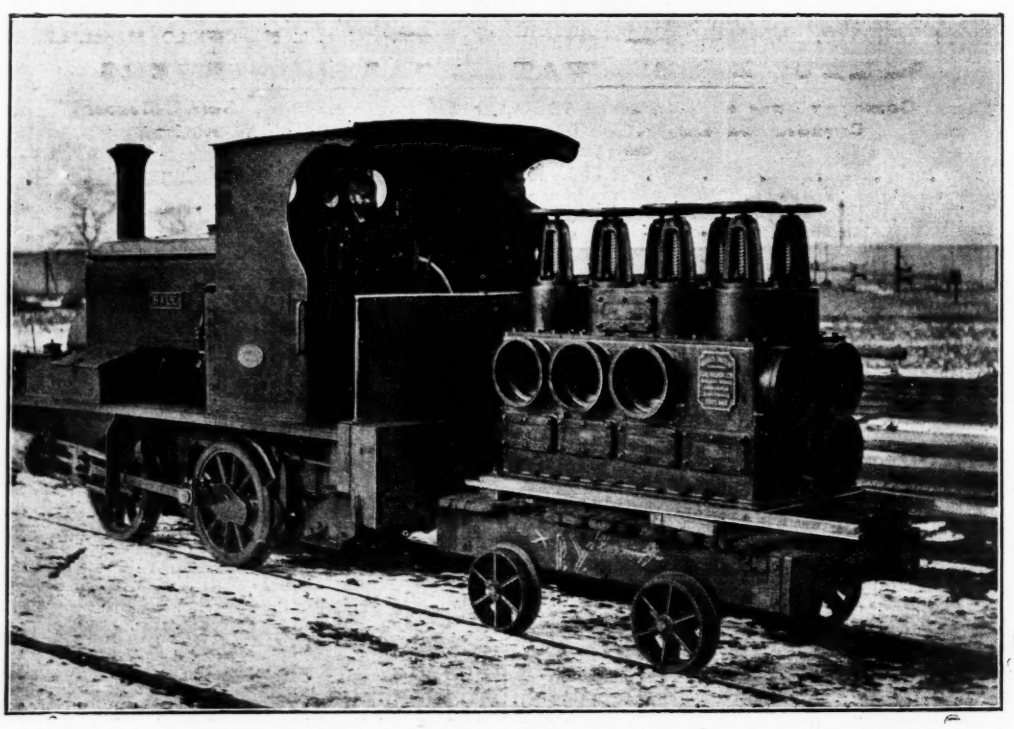

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Wenlock Water Supply.—The Town Council of the Borough of Wenlock having applied to the Local Government Board for sanction to borrow £23,000 for purposes of water supply for the Broseley and Madeley divisions of the borough (including the construction of certain works in the parish of Sutton Maddock, in the rural district of Shifnal), Mr. H. Percy Boulnois, one of their Inspectors, held an inquiry on the subject last Thursday. The Town Clerk (Mr. Godfrey Cooper) stated that £15,500 was required for Madeley, and £7500 for Broseley. There was no opposition.

New Water-Works for Todmorden.—Last Friday, Mr. G. F. Deacon attended a special meeting of the Todmorden Town Council for the purpose of explaining the plans from which water-works are intended to be carried out at Gorpley, for the supply of the borough of Todmorden. The new reservoir will be 84 feet deep, have a storage capacity of 120 million gallons, and yield more than 600,000 gallons per day. Nine tenders for the construction of the works had been considered by the Water Committee; and it was now resolved, on their recommendation, that the tender of Mr. B. Lumb, of Todmorden, be accepted—the price being stated to be within the estimate given by Mr. Deacon. The works are to be completed in 4½ years.

Torquay Gas Company.—In spite of competition by the municipal electric light undertaking, the Torquay Gas Company made gratifying progress last year. The statement of accounts, presented at the annual meeting on Thursday, showed that the total revenue amounted to £28,435, compared with £27,271 in 1898, and the expenditure to £20,643, against £20,125; leaving a balance of £7791 to be carried to profit and loss account, as compared with £7145 in 1898. Receipts from sales of gas amounted to £19,768, against £19,532; and residual products yielded £6791, against £5973. The expenditure included £10,581 for coals, £2443 for distribution, £1359 for rents, rates, and taxes, and £1145 for management. In their report the Directors observed that the consumption of gas had been well maintained. The increase, though small, showed that the efforts to popularize the use of gas by means of cooking-stoves, gas-fires, and prepayment meters had met with a large amount of success. The Chairman (Mr. W. H. Kitson), in moving the adoption of the report, remarked that the chief item in the increased cost of manufacture was an addition to the price of coal, for which they had to pay 1s. 2d. per ton more than in 1898. Distribution had also cost more because of increased expenditure on the repair of mains, largely due to traction-engine traffic over the roads. The quantity of gas sold was the largest in the history of the Company, and was 1¼ per cent. more than last year. This increase, in spite of the progress of the electric light and the mildness of the weather during the winter months of last year, was very satisfactory, and showed that there was plenty of room for both sources of light. The prepayment meters entirely accounted for the additional consumption. They had been a great financial success. Another profitable source of income was cooking-stoves, of which upwards of 900 were now in use; 330 of them being employed in connection with prepayment meters. Scarcely a dozen users of the electric light had entirely ceased to burn gas. From ordinary consumers they received last year £18,208, or an average of £7 each; and from prepayment consumers £1500, or an average of £2 each. With regard to the progress of the undertaking, ten years ago the receipts from sales of gas, at 3s. 3d. per 1000 cubic feet, were £15,368; while last year, with the price at 3s. and 2s. 6d., they reached £18,521. The receipts from public lighting were almost exactly the same as ten years ago—£1246, against £1245; while the returns from residuals had almost doubled, and the reserve fund had advanced from £6887 to £8814. The report was adopted, and the usual dividends declared.

Messrs. Biggs, Wall, and Co. have received instructions from the Kirkcaldy Gas Company to supply one of their "Rapid" charging-machines, and from a Colonial company for four similar machines.

In accordance with the announcement appearing in another part of the "JOURNAL," Mr. Alfred Richards will offer at the Mart, Tokenhouse Yard, to-morrow, by order of the Directors, £10,000 of 4 per cent. preference stock of the Brighton and Hove General Gas Company, in lots of £100 each. The dividend will accrue from the 1st prox.

The cookery lectures organized by Messrs. Richmond and Co., Limited, in the Parr Hall, Warrington, in connection with the Arts and Crafts Exhibition, have been unusually well attended, and a number of ladies have subscribed and presented Miss Sarah Barker, the lecturer, with a morocco purse of gold, as a mark of their appreciation of her talent.

The Directors of Messrs. James Milne and Son, Limited, of Milton House Works, Edinburgh, in their first annual report, state that for the year ending Dec. 31 last, after payment of interest and all charges, including an allowance for depreciation, there remained a balance of £14,021. Of this, the proportion due to the vendors, in terms of the agreement of sale, was £4644, which left a net sum of £9377. The Directors recommend the payment of dividends at the rate of 5 per cent. per annum, less income-tax, on the preference shares, amounting to £2971, and at the rate of 6 per cent. on the ordinary shares, amounting to £4000; and the placing of £1000 to the reserve fund and £700 to a special reserve fund for preference dividends. This leaves a balance of £706 to be carried forward, subject to payment of Directors' and Auditors' fees.

The second of a series of articles on "Local Industries," in the "Leith Burghs Pilot," is devoted to an account of the progress of the firm of Messrs. D. Bruce Peebles and Co., of Tay Works, Bonnington. The business was established in 1866, at Fountainbridge, Edinburgh, for the manufacture of meters, burners, governors, and engines, under the direction of the late Mr. D. Bruce Peebles, and rapidly gained a world-wide reputation. There is now an electrical department in connection with the business, which, under the supervision of Mr. Arthur Peebles, has grown to a marvellous extent; and at the beginning of last year there were in hand contracts of the value of £12,000. The works are equipped with English and American automatic appliances for manufacturing steel-clad dynamos and engines up to 50-horse power; and the plant is driven electrically by 15 separate motors of various powers. The current is supplied from the generating station of the Leith Corporation, and it costs the firm upwards of £600 per annum. The electrical staff has been organized by Mr. A. Hart, the foreman.

As the outcome of a conference between the Parliamentary Bills Committee of the Bristol Corporation and the Bristol Water Company, some objections raised by the Committee have been removed. By the Bill, the Company seek powers with regard to any lands within their "drainage area," which expression is defined to mean any area within which the waters the Company are authorized to impound or take arise or flow; also to make bye-laws for maintaining the purity and preventing the pollution, contamination, or discoloration of their waters, and to prescribe the construction, laying down, maintenance, protection, and use of drains, sewers, watercourses, and all other works and conveniences necessary and proper for such purposes. The Bill, if passed as originally drawn, would have given them power to prescribe what sewers and drains should be constructed and used within the city of Bristol; and the Committee therefore approached the Directors with the view of exempting any area within the city from its provisions. The result has been that the Company have consented to alter the definition of their drainage area so as to exclude the city of Bristol as for the time existing.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

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REQUIRED, by Advertiser of Fifteen Years' Experience, a position as Secretary, or ASSISTANT to a Gas or Water Company. Copies of recent Testimonials and Qualifications will be sent upon application.
Address No. 3460, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO RETORT MANUFACTURERS AND COLLIERY PROPRIETORS.

TRAVELLER with Ten Years' Con- nection among Gas-Works and Gas Engineers in Yorkshire, Lancashire, and Northern Counties, is open to REPRESENT a good Firm for FIRE-CLAY GOODS or GAS COAL. Excellent Reference.
Address No. 3462, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS COMPANIES AND CORPORATIONS.

IMPROVED CARBONIZING RESULTS.

A PRACTICAL Gas Engineer of 25 Years' Experience in both London and Provincial Gas-Works is open to VISIT GAS-WORKS, and ADVISE and REPORT upon the Best Methods in Working, by which the very best Results may be obtained. Gas-Works Managed *pro tem.* Terms moderate.
Address No. 3459, care of Mr. King, 11, Bolt Court, FLEET STREET E.C.

WANTED, for Works in the North of England, a DRAUGHTSMAN, thoroughly conversant with Gas Plant and General Engineering.
Address Letters (stating Salary required) to No. 3458, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Provincial Gas Com- pany, a thoroughly experienced MAIN and SERVICE LAYER.
Apply, stating Age, Experience, and Salary required, to No. 3454, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CANTERBURY GAS AND WATER COMPANY.

WANTED, by the Directors of this Company, an experienced and competent ENGINEER to take entire charge of the Gas-Works Station (make about 145 million cubic feet) and the Outdoor Department of both Gas and Water Works. He must have a practical knowledge of the Manufacture of Coal and Water Gas, and Sulphate of Ammonia upon the best modern Systems, and be competent to supervise the Distribution of both Gas and Water.
Applications, marked "Engineer," stating Age, Salary required, Training, and Experience, accompanied by *copies* of three Testimonials of recent date, to be delivered at the Company's Offices, Castle Street, Canterbury, on or before Saturday, the 31st of March inst.
A Residence (with Rates, Coal, Gas, and Water free) is provided on the Works.
By order,
JAMES BURCH,
General Manager and Secretary.
Canterbury, March 12, 1900.

WANTED, two Draughtsmen, ex- perienced in Designing, &c.
Apply, with full Particulars, to R. DEMPSTER AND SONS, LIMITED, Rose Mount Iron-Works, Elland, YORKS.

WANTED, a Working Manager for a small Works in the Midlands. Make of Gas 2 millions. Good House and Large Garden, and Gas, Water, and Rates Free.
Apply, stating Age and Wages required, to
ARTHUR GRAHAM.
Gas-Works, Mansfield.

DRAUGHTSMAN.

WANTED, for a large Gas-Works in Yorkshire, a thoroughly qualified DRAUGHTSMAN.
Apply, by letter, giving Age and Experience, and stating Salary required, to No. 3450, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Two or Three first-class RETORT SETTERS for a few months. None but steady Men need apply. Wages 8¾d. per hour, 56½ hours per week.
Apply, by letter, to
J. D. ASHWORTH,
Engineer.
Gas-Works, Portsmouth.

ROTHERHAM CORPORATION.
(GAS DEPARTMENT.)

WANTED, a first-class Man to take charge of Exhausters, Boilers, and Pumps. Twelve-hour Shifts. None but first-class Men need apply.
State Particulars and Wages required to the undersigned on or before April 1.
FRANK A. WINSTANLEY.

WANTED, immediately, a Man to take charge of a Works making about 8 Millions per Year. One accustomed to Regenerative Settings, Exhauster and Engine. Would also be required to fix and read Meters, and if able to do Fitting generally would be preferred. Cottage on Works, with some Garden, Gas, and Coals free.
Apply, stating Wages required, to MANAGING DIRECTOR, Gas-Works, Witney, OXON.

ST. IVES (HUNTS) GAS-WORKS.

MANAGER.

REQUIRED, a thoroughly qualified MANAGER for the above Works (make 10 millions per annum). Must thoroughly understand Modern Plant and Apparatus, including Boilers, Engine, Exhauster, &c. Good House, with Garden, provided.
Applications, with Testimonials and Particulars of Experience and Salary required, to be addressed to the undersigned.
H. W. WILSHERE,
Secretary.
1, Welford Road, Leicester.

TORQUAY GAS COMPANY.

WANTED, at once, a thoroughly good Man to act as FOREMAN of DISTRIBUTION DEPARTMENT. He must be well up in Main and Service Laying, and competent to take charge of, and direct, Workmen.
House Rent Free.
Applications, with *copies* of Testimonials, Particulars of Experience, and stating Age, whether Married or Single, and Wages required, must be sent to the undersigned.
ROBERT BEYNON,
Engineer and Manager.
Gas-Works, Hollacombe, Paignton.

ROCHESTER, CHATHAM, AND STROOD GASLIGHT COMPANY.

DISTRIBUTION SUPERINTENDENT.

THE Directors invite applications for the appointment of SUPERINTENDENT of the DISTRIBUTION DEPARTMENT of this Company.
Applicants must have a thorough knowledge of Main and Service Laying, Gas-Stove Fitting, &c., must be able to keep the Books of the Department, and in every respect carry out the duties appertaining to the position. The Salary will be £150 a Year.
Applications, in the Candidates' own writing, with *copies* of three Testimonials of recent date, and marked on the envelope "Distribution Superintendent," must be delivered to me not later than noon of Wednesday, April 4, 1900.
J. M. VEEVERS,
Secretary and General Manager.
Gas Offices, Rochester,
March 24, 1900.

COUNTY BOROUGH OF WALSALL.
(GAS DEPARTMENT.)

THE Corporation of Walsall require the services of a competent and experienced GAS ENGINEER and MANAGER for their Gas-Works. He must be capable of designing and superintending the carrying out of Extensions of the Works, and competent to undertake the entire control of the Works and the supervision of the Manufacture of Gas.
Salary £500 per annum. The appointment to be subject to Three Months' Notice on either side
A statement of Duties can be obtained from the undersigned, to whom applications, marked outside "Gas Engineer and Manager," accompanied by not more than three Testimonials, are to be sent on or before Saturday, the 14th of April, 1900.
Canvassing either directly or indirectly any Members of the Council will be considered a disqualification.
JOHN R. COOPER,
Town Clerk.
Town Clerk's Office, Walsall,
March 24, 1900.

WANTED, a good Gas-Fitter. One able to control Men; Main and Service Layer; and Meter Reading and Fixing. Wages to commence at 32s. per week. None but good Men need apply.
Address MANAGER, Gas-Works, SLOUGH.

CONDENSER (Morris & Cutler's), 21 ft. 6 in. by 6 ft. 6 in. by 3 ft. 6 in., 1 million per day. Equal to new. Exceptional Bargain, if sold promptly.
Address No. 3463, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE—Four lengths of Wrought- IRON HYDRAULIC MAIN, each 18 feet long, fitted with Covers and Dip-Pipes, and arranged for Settings of seven Retorts. The Bridge-Pipes may also be included.
For Particulars and Price, apply to
W. LANGFORD,
Engineer and Manager.
Corporation Gas-Works,
Longton, Staffs.

THE Corporation of Liverpool have for DISPOSAL a large number of Modern 14-inch Square LAMPS, Copper built throughout, with plain Glass Sides, and Opal Glass Tops, for use in Cradles or on Legs. They are in good repair; a large number of them being practically equal to new.
A Sample will be sent on application, and a Low Price accepted.
C. R. BELLAMY,
City Lighting Engineer.
Hood Street, Liverpool.

1899 Letter W. No. 9925.

IN THE CHANCERY OF THE COUNTY PALATINE OF LANCASTER, MANCHESTER DISTRICT.

WALMSLEY *v.* CLAY.

VALUABLE ENGLISH and FOREIGN PATENTS for Shock Proof Anti-Vibratory Fittings for Incandescent Gas Lighting, Tools, Accessories, Stores, and Effects at the Works and Premises 14, Johnson Street, Bolton.

LOMAX SONS & MILLS will Sell by AUCTION (pursuant to an Order of the Court dated the 4th day of December, 1899, and with the approbation of the Registrar of the Manchester District of the said Court) at the Public Sale Rooms, Bowker's Row, Bolton, on Thursday, the 5th day of April, 1900, at Seven o'clock in the Evening, subject to conditions—

LOT 1—"COILED PIPE" ANTI-VIBRATOR PATENT, being an improvement in, and connected with, the Burners for neutralizing the effects of Shock and Vibration on Mantles used in Incandescent Gas Lighting:
No. 6874, dated March 30, 1896. Also the patents in Germany, Belgium, Victoria, New South Wales, France, New Zealand, South Australia, Tasmania, Austria, Canada, Norway, United States of America, and Queensland for the same Invention.
"ARRESTER" PATENT for Bye-Pass Burners, which prevents Bearings from being pulled out of position, and also prevents the Coil from being strained:
No. 24,899, dated Nov. 2, 1896. Also the Patents in Germany and United States of America for the same Invention.
Together with the Fittings and Accessories appertaining to the said Patents.

LOT 2—"CANTILEVER" ANTI-VIBRATOR PATENT:
No. 27,827, dated Dec. 7, 1896. Also the patents in Norway, Sweden, Germany, Belgium, Victoria, South Australia, New South Wales, France, Tasmania, Canada, New Zealand, Queensland, and United States of America for the same Invention.
Together with the Fittings and Accessories belonging thereto.

LOT 3—The Tools, Stock-in-Trade, Stores, Office Furniture, Photographic Apparatus, Stationery, Fixtures and Effects comprising Bench and Brest Drilling Machines, Screwing Tackle, two Parallel Vices, Circular Saw, Grindstone, two Gas-Pressure Gauges, Foot Bellows, Joiners' Tools, Benches, Tables, Store Racks, Partitions, Packing Cases, 970 lbs. of Copper Tubing, Scrap Copper, Brass, and Lead, German Silver Wire, Pipe Fittings, Arc and Street Lamps, Works Lanterns, Fredureau Globes, Incandescent Burners, Mantles, Chimneys, Reflectors, Mahogany Pedestal Writing-Desk, Walnut Book Cupboard, Fireproof Safe, 30 in. by 22 in. by 22 in. (by John Crook) and Stand, Letter Copying-Press, Four-Lap Screen, Desk and Single Chairs, Corticine Floor Cloths, one Camera by Middlemiss, with Accessories, Books, Stationery, &c.

SCHEDULE of the Fittings and Accessories included in the Sale of the Patents and Inventory of the Tools, Stock-in-Trade, Stores and Effects will be produced at the time of sale, or may be inspected Seven Days prior to sale, and further Particulars had at the Chancery Office, Duchy Chambers, 4, Clarence Street, Manchester, on application to the Auctioneers, Central Chambers, Bolton (Telephone 181), and 54, John Dalton Street, Manchester (Telephone 3668); Mr. Samuel Greenhalgh, Chartered Accountant, Acresfield, Bolton; Messrs. Winders, Solicitors, Bowker's Row, Bolton; Messrs. Russell and Russell, Solicitors, 11, Wood Street, Bolton; Messrs. Boote, Edgar, and Co., Solicitors, 18 and 20, Booth Street, Mosley Street, Manchester; or to
Messrs. J. PHETHEAN MONKS AND Co.,
Solicitors.
Central Chambers,
Fold Street,
Bolton.

FOR SALE—Two Lancashire Boilers, each 6 ft. diameter by 20 ft. long, with Mountings. Been in use only a short time. Made by the Yorkshire Engine Company, Limited, Sheffield.

Apply to NEWTON, CHAMBERS, & Co., LIMITED, Thorncliffe Iron-Works, near SHEFFIELD, where the Boilers may be seen.

EXHAUSTERS, 1500 to 60,000 feet per hour, with or without Engines.

LIVESEY WASHERS, CUTLER CONDENSER, SCRUBBERS, 5 feet and 6 feet diameter, METERS, GOVERNORS, PURIFIERS (Sets of 6 feet and 10 feet square), BOILER and other TANKS, VALVES, &c.,

J. FIRTH BLAKELEY & Co., Thornhill, DEWSBURY.

ESTABLISHED 1828.

GAS and Electrical Engineering and Gas- Fitting Business to be DISPOSED OF. Proprietor, having absolutely the best Business of its kind in London, partly Manufacturing and partly Fitting, wishes, owing to ill-health, to retire. Technical experience not absolutely essential; but business ability. Under practical Managers who would remain. Large Turnover at exceptional Profits. Present Proprietor would give assistance and introduction for a given period, thus ensuring continuity of Business.

Bankers, and Solicitors' References.

Capital necessary, about £15,000.

Principals or their Solicitors only dealt with.

Apply, HICKLIN, WASHINGTON, AND PASMORE, Solicitors, 1, Trinity Square, SOUTHWARK, S.E.

CITY OF HULL WATER AND GAS DEPARTMENT.

GAS PLANT FOR SALE.

RETORT-HOUSE FITTINGS—Retort- FITTINGS for 120 Round Retorts, 16 inches diameter, Wrought-Iron Lids, Screws, and Cross-Bars, 7 inch to 5 inch and 6 inch to 4 inch Ascension, Arch, and Dip Pipes.

One HYDRAULIC MAIN ⊃ shape, 31 ft. by 18 in. by 18 in.

One HYDRAULIC MAIN ⊃ shape, 41 ft. by 18 in. by 18 in.

Thirteen HYDRAULIC MAINS ⊃ shape, 6 ft. 9 in. by 16 in. by 16 in.

Thirteen 6-inch SEAL-VALVES.

9-inch and 10-inch CAST-IRON FOUL-MAINS.

40 yards of 15-inch STEEL FOUL-MAIN.

CONDENSERS—

Set of six Cast-Iron ANNULAR CONDENSERS Outer Tube 2 feet, Inner Tube 10 inches, with Inlet and Outlet Valves and Bye-Pass.

TAR-EXTRACTOR—

Patent CARBONIC ACID and TAR EXTRACTING WASHER, by C. & W. Walker, for 500,000 cubic feet per day, 12-inch Valves and Bye-Pass.

WASHER—

One WASHER by Kirkham, Hulett, and Chandler for 500,000 cubic feet per day, with Steam-Engine, 10-inch Valves, and Bye-Pass complete.

PURIFIERS—

One set of Four PURIFIERS, 15 feet square, 4 feet deep, with Centre-Valve, and 15-inch Connections, Columns and Girders for fixing on first floor, together with Lifting Tackle.

One set of Two PURIFIERS, 15 feet square, 4 feet deep, with Centre-Valve, and 15-inch Connections. Columns and Girders for fixing on first floor, together with Lifting Tackle.

EXHAUSTERS AND STEAM-ENGINES—

Two 30,000 cubic feet per hour EXHAUSTERS and ENGINES, nearly new, by George Waller and Co.

12-inch Automatic BYE-PASS.

3-inch THROTTLE VALVE.

3-inch improved COMPENSATING GOVERNOR.

Two patent STEAM COMPENSATING GOVERNORS.

12-inch CONNECTIONS complete.

BOILERS—

Two Steel CORNISH BOILERS, 16 ft. by 5 ft. 6 in., with Galloway Tubes, Mountings complete for 70 lbs. pressure.

GASHOLDERS—

One THREE-LIFT GASHOLDER, about 71 feet diameter by 20 feet deep. Wrought-Iron Standards, Girders, Valves, and Connections.

One TWO-LIFT GASHOLDER, about 49 feet diameter by 18 feet deep. Cast-Iron Columns, Girders, Valves, and Connections.

Two TWO-LIFT GASHOLDERS, 46 feet diameter by 18 feet deep. Cast-Iron Columns, Girders, Valves, and Connections.

STATION METER—

STATION METER, to pass 30,000 cubic feet per hour.

GOVERNORS—

14-inch and 6-inch GOVERNORS.

PUMPS—

Various STEAM, TAR, LIQUOR, and WATER PUMPS.

GAS-ENGINE—

12-Horse Power by Crossley Bros.

VALVES—

DONKIN and other VALVES.

The above-mentioned Machinery, &c., may be seen on application to the undersigned.

Offers for the whole, or any part, of the Plant to be addressed to the Chairman of the Water and Gas Committee, and delivered to the Office of the Town Clerk, Hull.

By order,
F. J. BANCROFT,
Water and Gas Engineer.

HAWORTH URBAN DISTRICT COUNCIL.

FOR SALE, by Tender—Second-hand CONDENSERS, comprising: 32 lengths of 7-inch Piping, each 9 ft. long; Eight Bridges, with loose Plugs; Bottom Box, 10 ft. 3 in. long, 2 ft. 1 in. deep, and 3 ft. 2 in. wide; Four 6-inch Rack and Pinion Valves (Clapham's).

May be seen on application to the Gas-Works Manager, Gas-Works, Haworth.

Tenders to be sent to me not later than the 29th of March, endorsed "Tender for Condensers."

WM. ROBERTSHAW,
Clerk.

Burlington Chambers,
North Street, Keighley,

ALDERSHOT GAS AND WATER COMPANY.

THE Directors of this Company are pre- pared to receive TENDERS for the supply of 20,000 Tons of GAS COAL and 500 Tons of CANNEL, for delivery from July 1, 1900, to June 30, 1901.

Copies of Specification and Conditions can be had on application to the undersigned.

Sealed Tenders, endorsed "Tenders for Coal," should be sent to me not later than Five p.m., May 9, 1900.

The Directors reserve the right not to accept the lowest or any Tender.

By order.
R. W. EDWARDS,
Secretary.

General Offices, Aldershot,
March, 1900.

TENDERS FOR GAS COAL.

THE Directors of the Windsor Royal Gaslight Company invite TENDERS for 9800 Tons of High-Class GAS COAL, with option of taking 100 Tons per month in addition; and also 150 Tons of New Boghead CANNEL in small quantities as required, to be delivered free to the Great Western Railway Station at Windsor during the Twelve Months ending the 31st of May, 1901.

Deliveries to be made in such quantities and at such times as may be required by the Company.

Sealed Tenders, endorsed "Tender for Coal," to be sent by post to reach the undersigned by Tuesday morning, the 1st of May. Forms of Tender not supplied.

The Directors do not bind themselves to accept any Tender.

By order,
JOHN HENRY STRANGE,
Secretary.

2, Victoria Street, Windsor,
Berks, March 13, 1900.

CARBURETTED WATER-GAS PLANT.

THE Directors of the Windsor Royal Gaslight Company are prepared to receive TENDERS, accompanied with Plans and Specifications, for the supply and fixing complete, including Purifiers, Station Meter, Gasholder, &c., required for a PLANT capable of producing 250,000 cubic feet of CARBURETTED WATER GAS per day.

Further Particulars can be obtained from the Engineer, Mr. James Wadeson.

Sealed Tenders, endorsed "Carburetted Water-Gas Plant," to be delivered at the Company's Office, 2, Victoria Street, Windsor, addressed to the Chairman and Directors of the Windsor Royal Gaslight Company, not later than the 30th day of April, 1900.

The Directors do not bind themselves to accept any Tender.

By order,
JOHN HENRY STRANGE,
Secretary.

ASCOT DISTRICT GAS COMPANY.

THE Directors of the above Company invite TENDERS for the supply, and delivery to Sunningdale and Bagshot Stations of about 2200 yards of 8-INCH SPIGOT and SOCKET CAST-IRON PIPES (weight 3.1.14) and SPECIALS.

Also 4000 yards of 6-INCH SPIGOT and SOCKET CAST-IRON PIPES (weight 2.1.14), and SPECIALS.

TENDERS are also invited for the LAYING of the above PIPES from the Company's present Mains through Windlesham to Bagshot in the county of Surrey.

Particulars may be obtained on application to the Manager, Mr. A. E. Brooks, Gas-Works, Sunninghill, Berks.

The Directors do not bind themselves to accept the lowest or any Tender.

Tenders to be delivered to the undersigned not later than the 4th of April, 1900.

W. A. SCHULTZ, F.C.A.,
Secretary.

46, Cannon Street,
London, E.C.

ILMINSTER GASLIGHT, COAL, AND COKE COMPANY, LIMITED.

TENDERS FOR GASHOLDER AND TANK.

THE Directors of the above Company invite TENDERS for the supply and erection of a steel GASHOLDER, 20,000 cubic feet capacity, and BRICK CEMENT PUDDLE TANK, with necessary Valves and Connections for same. Diameter of Holder 40 feet.

Persons tendering for same to furnish their own Plans and Specifications.

The whole of the work will have to be completed by the 31st of October, 1900, to the entire satisfaction of the Company's Manager.

Sealed Tenders, accompanied by Drawings and Specifications, endorsed "Tender for Gasholder," to be addressed to the Chairman of the Company, Ilminster, not later than Tuesday, the 10th day of April, 1900.

The person whose Tender is accepted will be required to furnish approved Sureties for the due performance of the Work.

The Company do not bind themselves to accept the lowest or any Tender.

Ilminster, Somerset,
March 22, 1900.

RADCLIFFE AND PILKINGTON GAS COMPANY.

TENDERS FOR PIPES.

TENDERS are invited for the supply of 750 yards of 4-INCH PIPES, 750 yards of 3-INCH PIPES, and a number of SPECIALS.

Particulars may be had from the undersigned, by whom Tenders will be received until Tuesday, the 3rd of April next.

JAMES BRADDOCK,
Manager and Secretary.

Gas Offices, Radcliffe,
March 23, 1900.

ROTHERHAM CORPORATION.

(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for the RE-SETTING of Six SETTINGS of INCLINED RETORTS.

Particulars may be obtained on application to the Engineer (Mr. F. A. Winstanley), Gas Offices, Bridgegate.

Endorsed Tenders must be delivered to the undersigned on or before Saturday, April 14, 1900.

H. H. COPNALL,
Town Clerk.

March 23, 1900.

PRESCOT GAS COMPANY.

THE Directors of the Prescot Gas Com- pany are prepared to receive TENDERS for the making and erection of two WROUGHT-IRON ROOFS—one 47 ft. 6 in. span, and 40 ft. 9 in. long; and one 22 ft. 8 in. span, and 29 ft. long, at their Gas-Works.

Plans and Specifications can be inspected at the Gas Company's Offices.

Tenders, endorsed "Tenders of Roofs," to be sent to the Chairman of the Gas Company, not later than April 7, 1900.

JOHN E. HALL,
Engineer, &c.

Gas Offices, Moss Street,
Prescot, March 23, 1900.

THE Methley Urban District Council invite TENDERS for the Providing and Fixing of 92 GAS-LAMPS, and making all connections with the Gas-Mains.

General Plan and Specification can be seen at the Offices of the Engineer, Mr. W. L. Le Maitre, 5, Central Bank Chambers, Leeds, from whom Bills of Quantities and Forms of Tender may be obtained on payment of a deposit of Two Guineas, which will be returned on receipt of a *bonâ-fide* Tender.

Tenders, endorsed "Tender for Lighting Scheme," must be sent to my Office, 83, Albion Street, Leeds, on or before the 20th day of April, by Twelve o'clock noon.

Dated this 23rd day of March, 1900.

ROBT. S. WIGIN,
Clerk.

LIVERPOOL UNITED GASLIGHT COMPANY.

THE Directors of the Liverpool United Gaslight Company are prepared to receive TENDERS for the supply of a quantity (not exceeding 15,000 Tons) of OIL, suitable for the manufacture of Carburetted Water Gas.

The Oil is to be delivered between the 1st of June, 1900, and the 30th of June, 1901.

Specification and full Particulars may be obtained on application to the undersigned, to whom Tenders must be delivered on or before Wednesday, the 18th of April, 1900.

WILLIAM KING,
Engineer.

Gas Office,
Duke Street, Liverpool,
March 21, 1900.

TO ENGINEERS AND IRONFOUNDERS.

THE Directors of the Sheffield United Gaslight Company invite TENDERS for the supply and erection of the following PLANT at their Grimesthorpe Works:—

One 9-inch CAST-IRON CONDENSER, 76 ft. long, 19 ft. high, and 11 ft. wide, with 30-inch diameter. Connections, and Supporting Girders.

30 STEEL and CAST-IRON COKE-HOPPERS for front of Retort-Bench.

Drawings may be seen, and Specifications and Quantities obtained, on application to the Company's Engineer, Mr. J. W. Morrison, on and after the 20th inst.

Sealed Tenders, marked "Condensers," "Coke-Hoppers," must be delivered to the undersigned by post not later than the first post on Monday, April 2, 1900.

The Directors do not bind themselves to accept the lowest or any Tender.

HANBURY THOMAS,
General Manager and Secretary.

Commercial Street,
Sheffield, March 10, 1900.

COUNTY BOROUGH OF HALIFAX.

THE Gas-Works Committee of the Hali- fax Corporation are prepared to receive TENDERS for the supply and erection at the Gas-Works, Mulcture Hall Road, Halifax, of (*a*) STEEL BASE and SHELL for CHIMNEY; (*b*) ELEVATOR, CONVEYOR, and GEARING for same.

Forms of Specification, Print, and Tender may be obtained on application to Mr. Thomas Holgate, M.Inst.C.E., Gas Engineer, Halifax, on payment of £1 for each set, which will be returned on the receipt of a *bonâ-fide* Tender.

Tenders, endorsed "Steel Shell" or "Elevator," as the case may be, may be sent to the undersigned before Two o'clock p.m., on Wednesday, the 4th of April, 1900.

The person whose Tender is accepted will be required to observe the Fair Contracts Clauses adopted by the Corporation.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
KEIGHLEY WALTON,
Town Clerk.

THE Urban District Council of Atherton invite TENDERS (on or before Wednesday, April 11) for the supply, during Twelve Months from the 1st of June next, of 6000 Tons of screened GAS COAL or NUTS.

Forms of Tender and further Information may be had on application to

D. SCHOFIELD,
Clerk.

Atherton, March 21, 1900.

BOROUGH OF MACCLESFIELD.

TENDERS FOR TAR AND AMMONIACAL LIQUOR.

THE Gas Committee are prepared to receive TENDERS for the purchase of the Surplus TAR and AMMONIACAL LIQUOR made at their Works during the Twelve Months commencing the 1st day of May next.

Tenders for the Tar or Liquor, separately, to be sent in not later than Tuesday, the 10th of April, 1900, addressed to the Chairman of the Gas Committee, Town Hall, Macclesfield, and endorsed "Tender for Tar, &c."

For Conditions, apply to Mr. Newbigging, Engineer, Gas-Works, Macclesfield.

The Committee reserve to themselves the right of accepting any Tender for the Tar or Liquor separately.

The highest or any Tender not necessarily accepted.

W. FREDK. TAYLOR,
Town Clerk.

March 14, 1900.

In the High Court of Justice, 1900, *F.O.* 28 *Chancery Division, Mr. Justice BYRNE, in Chambers.*

In the matter of Frank Wright's Prepayment Gas-Meter Corporation, Limited and Reduced, and in the matter of the Companies Acts, 1867 and 1877.

NOTICE is Hereby Given, that a Petition presented to the High Court of Justice, Chancery Division, on the 6th day of March, 1900, for CONFIRMING A SPECIAL RESOLUTION REDUCING THE CAPITAL of the above Corporation from £110,000 to £60,000, is directed to be heard before His Lordship, Mr. Justice Byrne, on Saturday, the 7th day of April, 1900; and any Creditor or Shareholder of the said Corporation desiring to oppose the making of an Order for the Reduction of the Capital of the said Corporation under the above Acts, should appear at the time of hearing, by himself or his Counsel, for that purpose, and a copy of the Petition may be seen by any Creditor or Shareholder at the Office of the Corporation, 62, Glengall Road, Old Kent Road, S.E., and on payment of the regulated charges for same, a copy will be supplied by the Solicitors under-mentioned.

Dated this 20th day of March, 1900.

C. BURNEY,
Master.

ADAM BURN AND SON,
6, Bell Yard, Doctors' Commons, E.C.,
Solicitors for the Corporation.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by AUCTION of GAS and WATER STOCKS and SHARES under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
BRIGHTON AND HOVE GENERAL GAS COMPANY.

£10,000 FOUR PER CENT. PREFERENCE STOCK,

Offering to Trustees and others an Investment of the soundest character.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Wednesday, March 28, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
HARROW AND STANMORE GAS COMPANY.

NEW ISSUE OF 300 £10 "C" SHARES.
STANDARD DIVIDEND 7 PER CENT.; LAST DIVIDEND £5 12s. PER CENT.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, the 3rd of April, at Two o'clock.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

WEST HAM GAS COMPANY.
CROYDON COMMERCIAL GAS COMPANY.
KINGS LYNN GAS COMPANY.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, E.C., on Tuesday, April 3, at Two o'clock, STOCKS and SHARES in the above Companies.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER.

Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.

Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

NITRATE of Thorium and Cerium.
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GAS PLANT New or 2nd Hand Equipments for Coal Gas, Water Gas, Oil, Acetylene, Coke Oven, and Blast Furnace Gas.

POWER or LIGHT WORKS.

Also VALUATION Consultation, Inspection, & Expert Reports.

JAS. WRIGHT, M.I.M.E. BRIDGE HOUSE, BLACKFRIARS, E.C.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY, LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH N.B.

JAMES OAKES & CO.

ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts and Covers, and rendering Leakage impossible.

LONDONDERRY GAS COALS

FROM THE

LONDONDERRY COLLIERIES,

COUNTY OF DURHAM.

Available Output up to 5000 Tons per day.

Yield of Gas 11,000 cubic feet per Ton of Coal as per Analysis by

Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,
SEAHAM HARBOUR,
COUNTY OF DURHAM.

THOMAS TURTON AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY
FOR ENGINEERS.

STEEL OF ALL DESCRIPTIONS.

SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS,
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.

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UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD
BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

HARDMAN & HOLDEN, LD.

ESTABLISHED 1820.

SULPHURIC ACID.

GUARANTEED absolutely free from Arsenic and of excellent Purity. Specially prepared for Sulphate of Ammonia Manufacturers.

Works: BLACKBURN; Miles Platting and Clayton, MANCHESTER.

Head Office: Miles Platting, MANCHESTER.

Inquiries Solicited.

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WORKED BY THE

WEARDALE IRON & COAL CO., LD.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON.

Yield of Gas per Ton . .	10,500 Cub. Ft.
Illuminating Power . . .	16·9 Candles.
Coke (of good quality) . .	67·5 per Cent.
Sulphur	0·58 ,,
Ash	2·73 ,,

For Price, &c., apply to the

WEARDALE IRON & COAL CO., LD.
QUAYSIDE, NEWCASTLE-ON-TYNE.

HOLMSIDE
GAS COALS.

Present Daily Produce over 5000 Tons.

Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton . . .	11,205 Cubic Feet.
Illuminating Power	16 7/10 Stand. Sperm. Candl.
Coke (of good & pure quality)	13¾ Cwt. per Ton.
Sulphur	A little over 1 per Cent.
Ash	Under 1 per Cent.
Tar	163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor	103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR
PELTON GAS COALS.

Present Daily Produce available 3000 Tons.

Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.

Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE & SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

NOTIFICATION

To Gas Engineers & Manufacturers of Retort Mouthpieces, &c.

In order to obtain Holman's **LATEST IMPROVEMENTS** in **ECCENTRIC FASTENINGS** for the **LIDS OF GAS-RETORTS**, it is important to insert the following description in Specifications—viz., **"Retort Mouthpieces and Self-Sealing Lids, fitted with Holman's Eccentric Bar-Lock Fastenings."**

Prices and Particulars will be furnished by applying to **THE CONSOLIDATED ENGINEERING COMPANY, LIMITED, SLOUGH, BUCKS** (near London); or to **STEPHEN HOLMAN, M.Inst.C.E., 1, COLLINGHAM ROAD, SOUTH KENSINGTON**—The Original Inventor of Eccentric Fastenings for the Lids of Gas-Retorts, of which there are over 150,000 in use.

WORKMANSHIP and MATERIALS OF THE HIGHEST QUALITY.

PECKETT'S LOCOMOTIVES

Built to any Specification or Gauge.

PECKETT & SONS, Atlas Locomotive Works, **BRISTOL.**

TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
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Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

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PRICE'S COKE & COAL BARROW

effects a great saving of time, labour, and expense.
For Particulars Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

Prices are Reduced.

BOLDON GAS COALS.

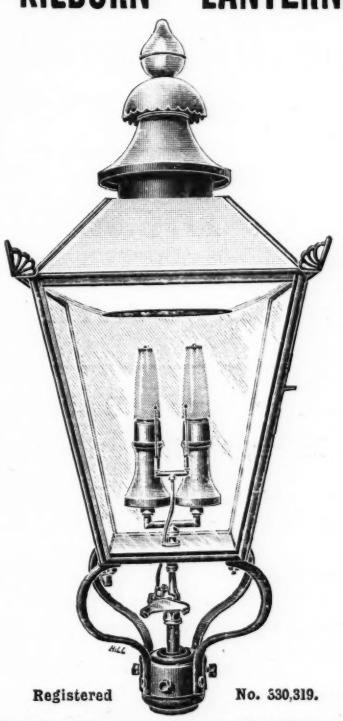
ANALYSIS.

Yield of Gas per Ton.	10,500	Cubic Feet.
Illuminating Power	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

For Prices, &c., apply to
W. H. PARKINSON,
THE HARTON COAL CO., LTD.,
NEWCASTLE-ON-TYNE.

Telegraphic Address: "PARKINSON, NEWCASTLE."

THE "KILBURN" LANTERN.



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Telephone: 1215 HOLBORN. Telegrams: "LUMINOSITY."

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,201·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	17·8 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

For Prices and complete Analysis, apply to
THOS. W. DANCE, SON, & HUNTER,
COAL OWNERS, NEWCASTLE-ON-TYNE;
OR
E. FOSTER & CO.,
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INCLINED **RETORTS**

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Proprietors of

ALDWARKE MAIN, CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.

ALDWARKE MAIN GAS COAL

Analysis: 12,600 Feet of 19-Candle Gas per Ton.

Value in Pounds of Sperm, 820·80.

VERY FREE FROM IMPURITIES.

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DENAYROUZE LIGHT SYNDICATE, LTD.

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The Pioneers of Incandescent Burners without Chimneys.

THE "SMALL TORCH" Burner (Bandsept Patent) for Street Lighting, consuming **3½** feet of Gas per Hour, having an efficiency of **25-Candle Power per Cubic Foot of Gas** consumed at ordinary pressure, is not only the **BEST** but **CHEAPEST** intensive **CHIMNEYLESS** Burner on the Market.

PRICE COMPLETE WITH MANTLE

4s. 9d.

All other Burners supplied by the Syndicate proportionately reduced, full Particulars of which will shortly be issued to the Trade, and followed by new and complete Catalogue.

CHIMNEYLESS INCANDESCENT BURNERS.

NEW SUNLIGHT INCANDESCENT COMPANY

LIMITED.

WE HEREBY GIVE NOTICE, that our **DE MARE PATENT** has now been finally amended, notwithstanding the strenuous opposition of the Welsbach Incandescent Gas Company, and the claims are settled beyond appeal, as follows :—

1. In Incandescent Gas-Burners wherein the light is obtained by means of a radiant tissue, an ejector **having the form of two cones united at their summits,** and placed beneath the air chamber and immediately over the cone from which the Gas issues.

2. The right to employ any form of Incandescent Burner deemed suitable while retaining the two cones substantially as described.

We claim that this patent is a **Master Patent** for Incandescent Burners "having the form of two cones united at their summits;" and proceedings have long since been commenced by us against the Welsbach Company, as makers and sellers of the

KERN BURNER

which embodies this form. In the event of our succeeding in this Action, we shall be in a position to follow all such Burners into the hands of their actual users, **AND TO REQUIRE THEIR DELIVERY UP OR DESTRUCTION.** That is why we give this emphatic warning to all Dealers and Users to beware of investing their money in Burners infringing our Patent, the sale or use of which will render them liable to an Action for Damages for Infringement of our Patent, and delivery up and destruction of the goods. Besides, our

SIMPLEX BURNER

gives better results, and costs less money, with no risk to the seller or user.

New Sunlight Incandescent Co., Ltd.,

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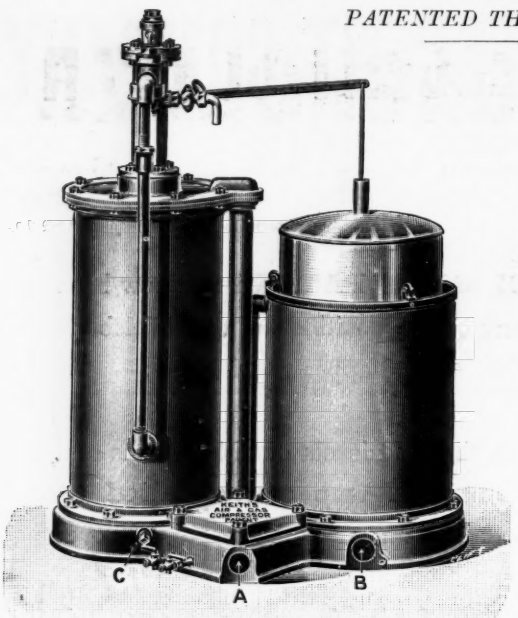
Telegrams: "IGNIFLUOUS."

Telephones: { 947 HOLBORN. 1403 HOLBORN.

6th March, 1900.

KEITH'S PATENT
AUTOMATIC GAS OR AIR COMPRESSORS.
WORKING WITH OR WITHOUT WATER POWER.

PATENTED THROUGHOUT THE WORLD.



"Simplicitas Maxima Virtus."

ADOPTED BY

The Welsbach Incandescent Gas-Light, Co., Ltd.,
The Intensified Gas-Light Company, Ltd.,
The New Sunlight Incandescent Company, Ltd.,
The Yorkshire Intensified Gas Lighting Syndicate,
Société Anonyme d'Eclairage et de Chauffage Intensifs (Somzée-Greyson System), Brussels.

And by others, for their Systems of

HIGH PRESSURE OR INTENSIFIED GAS-LIGHTING.

THIS INVENTION, as illustrated :—
Is worked by the ordinary Water Service; is absolutely automatic in action; uses an infinitesimal amount of water; is silent in operation, and requires no attention; is devoid of friction in the compressing portion, and requires no lubrication; gives a steady, unvarying pressure of gas or air without pulsation on either the inlet or outlet side; and is the most compact, economical, and perfect Apparatus of the kind in existence.

The Apparatus may also be worked without water power and solely by the use of gas, giving equally efficient and automatic results.

BEWARE OF UNSCRUPULOUS IMITATIONS.

Plants of any magnitude designed for automatically increasing Gas Pressure in low-lying districts.

THE WATER MOTOR & AUTOMATIC LIQUID ELEVATOR Co., Ltd.,
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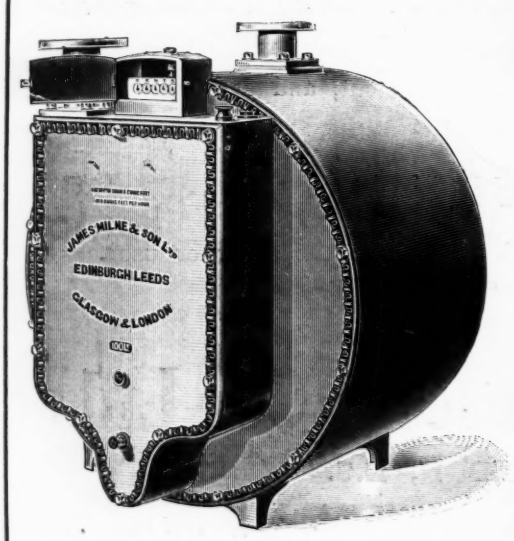
THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL CLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

Midland and West of England District Office: 6, CORPORATION STREET, BIRMINGHAM—Sole Agent: A. C. SCRIVENER.
Telegraphic Address: "WIGAN, BIRMINGHAM." Telephone No. 200.

London District Office: 6, STRAND, LONDON—C. PARKER & SON, Sole Agents.
Telegraphic Address: "PARKER, LONDON."



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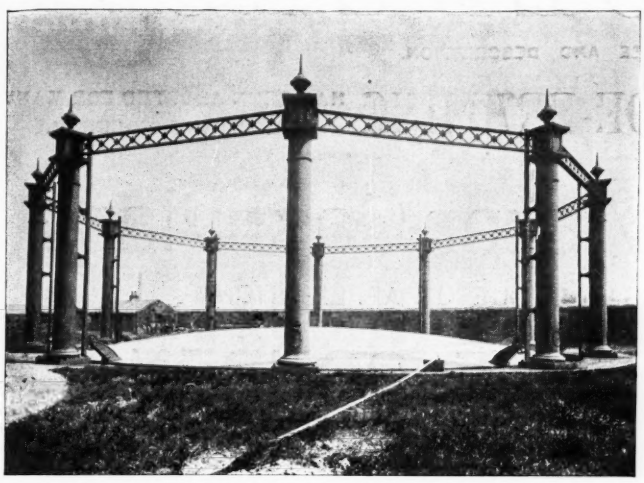
EDINBURGH.
LONDON. GLASGOW. LEEDS.

LARGE WET METERS
IN CAST-IRON CASES.

FLANGE OR SOCKET CONNECTIONS.
WITH OR WITHOUT FLOAT.

SUPPLIED WITH INLET AND OUTLET CONNECTIONS AT BACK IF PREFERRED.

GASHOLDERS



A GASHOLDER

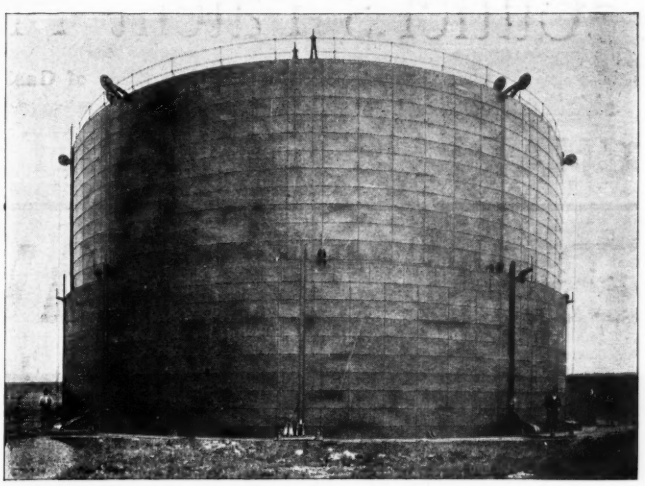
Guided by Ten massive Cast-Iron Columns and Girders is shown in the accompanying Photo.

AS IT WAS

originally erected by us

IN 1883.

We last year took down the Guide-Framing, converted the Holder into a Two-Lift; and this Photo. ☛ shows it



AS IT IS NOW

entirely guided by our Patent Steel Cable System.

In many other instances, Columns have been sold and replaced by our Cables.

We are prepared to alter any Holders in a similar manner to the above. Engineers who have trouble with the irregular working of Column-Guided Holders will find the Cable System vastly superior and quite reliable.

PATENTEES AND SOLE MANUFACTURERS:

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GAS AND ELECTRICAL ENGINEERS,

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Accumulators, Complete Installations for Light and Power, Gasholders (with and without Columns), Purifiers, Scrubbers, Condensers, Washers, Roofs, Girders, Sulphate Plants, Valves, &c., &c.

London Office: 181, QUEEN VICTORIA STREET, E.C.

Telegrams: "Gasholder, Stockton-on-Tees." "Apparatus, London."

Paris Office: 3, SQ. DES BATIGNOLLES.

S. CUTLER AND SONS, MILLWALL, LONDON.

GASHOLDERS

OF EVERY SIZE AND DESCRIPTION.

CUTLER'S PATENT GUIDE-FRAMING HAS BEEN ADOPTED FOR MANY IMPORTANT HOLDERS.

Carburetted Water-Gas Plant.

SPECIAL DESCRIPTIVE CATALOGUE ON APPLICATION.

PATENT WATER-TUBE CONDENSER

Over 120 now in use.

Cutler's Patent Freezing Preventer

For keeping Cups of Gasholders free from Ice.

CHARLES HUNT PATENT GAS-WASHER.

R. LAIDLAW & SON,

ENGINEERS & IRONFOUNDERS,

CAST-IRON PIPES

ALL SIZES.

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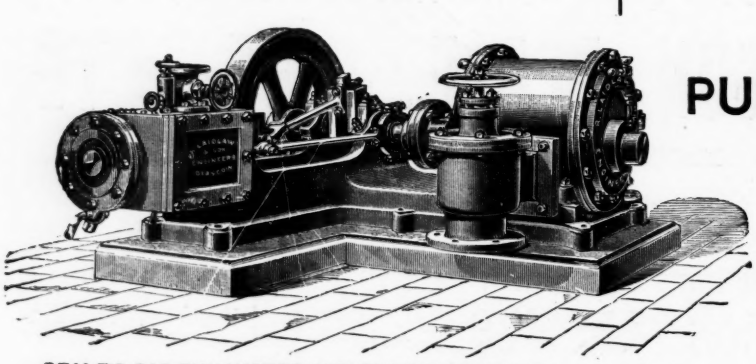
AND

PUMPING-ENGINES.



BEALE'S GAS EXHAUSTER AND ENGINE COMBINED. ALL SIZES.

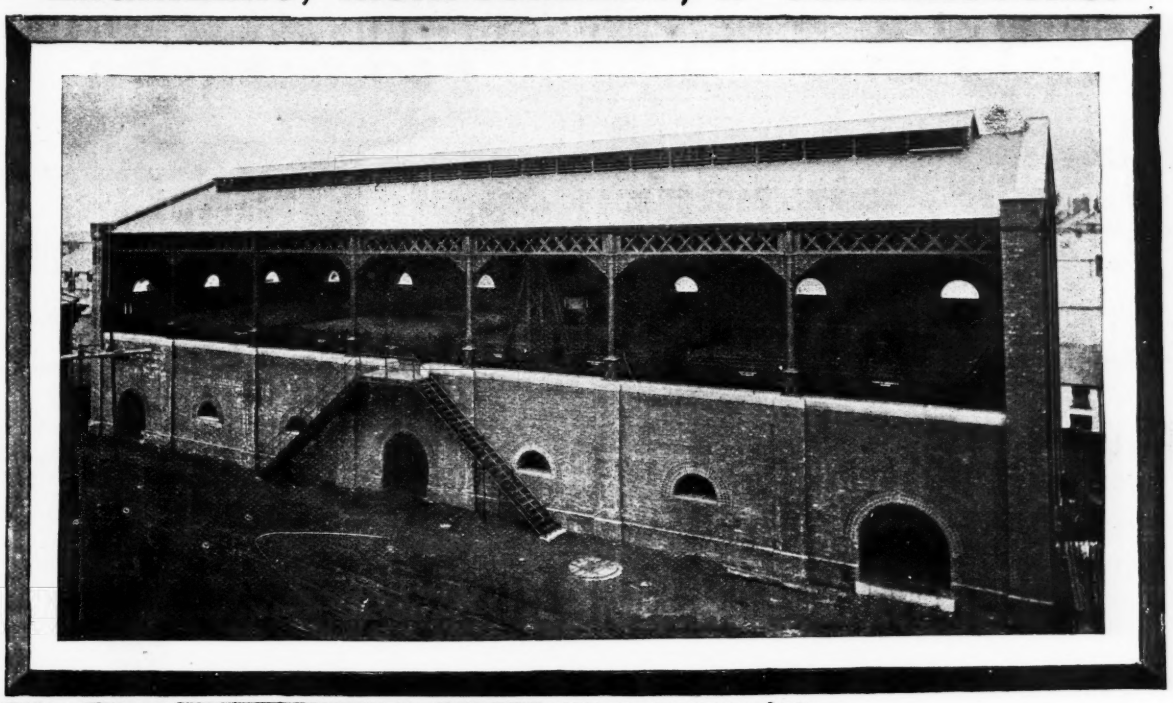
ALL KINDS OF

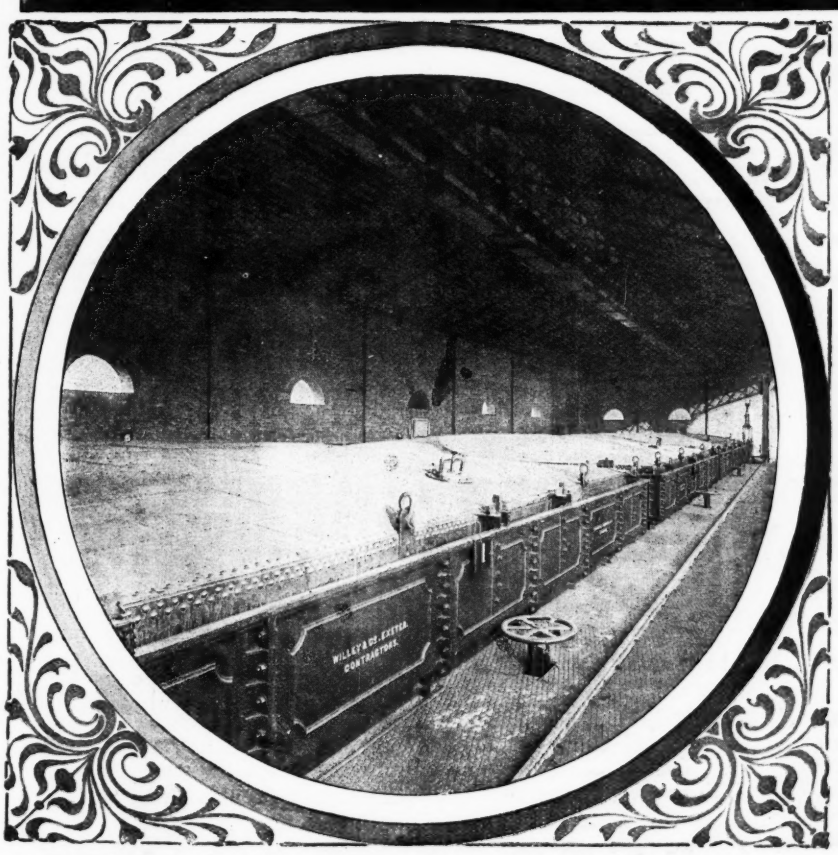
GAS AND WATER APPARATUS.

ALLIANCE FOUNDRY, GLASGOW. | SIMON SQUARE WORKS, EDINBURGH. | 6, LITTLE BUSH LANE, LONDON, E.C.

WILLEY & CO.,

ENGINEERS, IRONFOUNDERS, & CONTRACTORS.





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Overhead

Purifiers

WITH STAGING, ROOF, 24-IN. VALVES & CONNECTIONS, &C., COMPLETE.

Recently CONSTRUCTED and ERECTED for the

Swansea Gas Co.

To the Design of
THORNTON ANDREWS, Esq., C.E.

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Telegrams: "WILLEY, EXETER."
Telephone: 132 and 263.

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OF GASELIERS
IN GLASS AND METAL.

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GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.

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ARROL-FOULIS

Patent Automatic Machinery

FOR

DRAWING AND CHARGING GAS-RETORTS.

Full Particulars may be obtained from the Sole Makers,

SIR WILLIAM ARROL & CO., Limited,

GLASGOW.

[See Illustrated Advertisement, March 6, p. 587.]

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UP-TO-DATE FURNACES AND SETTINGS.

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ESTABLISHED 1844. **ORIGINAL MAKERS.** ESTABLISHED 1844.

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THE SIX MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS;

The latter being the Highest Award for Dry Gas-Meters at the Paris Exhibition, 1867. Since then we have not Exhibited FOR PRIZES.

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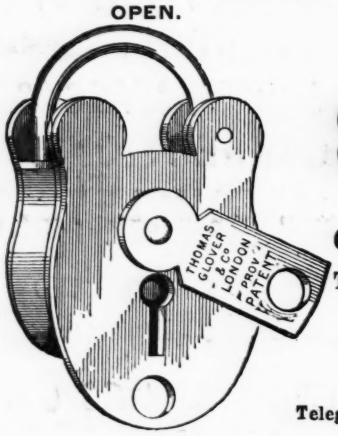

THOMAS GLOVER & CO.'S

PATENT

SECURE PADLOCK

PREVENTS TAMPERING WITH THE

CASH-BOXES OF PREPAYMENT METERS.

The Padlock is Sealed by means of a Lead Eyelet, which is impressed with Company's private mark. Eyelets easily fixed and removed by Company's Collector.

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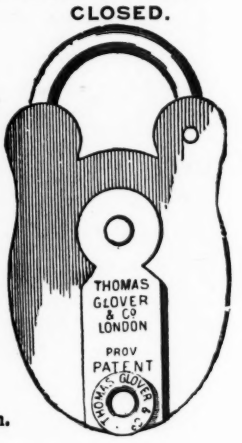

Telegraphic Address: "GOTHIC, LONDON." Telephone No. 725, Holborn.

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BIRMINGHAM: 1, OOZELLS STREET. *Telegraphic Address: "GOTHIC."*

MANCHESTER: 37, BLACKFRIARS STREET. *Telegraphic Address: "GOTHIC."* **Telephone No. 8393.**

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MANUFACTURERS OF
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LUMPS, TILES, AND ALL ARTICLES IN FIRE-CLAY.
Proprietors of Best Glasshouse Pot, Crucible, and other Stourbridge Clays.

Manufacturers of Glasshouse Pots and Crucibles of every kind.
Established 1836.

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Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.
Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

BOWENS' Ltd. Successors,
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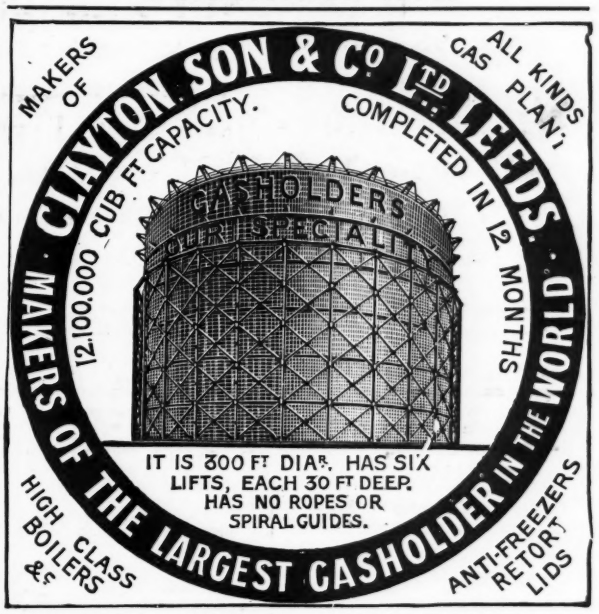
Established 1860.


MAKERS OF
CLAYTON, SON & Co LTD LEEDS.
ALL KINDS GAS PLANT
12,100,000 CUB FT CAPACITY.
COMPLETED IN 12 MONTHS
GASHOLDERS
SPECIALITY
MAKERS OF THE LARGEST GASHOLDER IN THE WORLD
IT IS 300 FT DIAR. HAS SIX LIFTS, EACH 30 FT DEEP. HAS NO ROPES OR SPIRAL GUIDES.
HIGH CLASS BOILERS &c
ANTI-FREEZERS RETORT LIDS

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RECEIVED JAN. 25, 1900.

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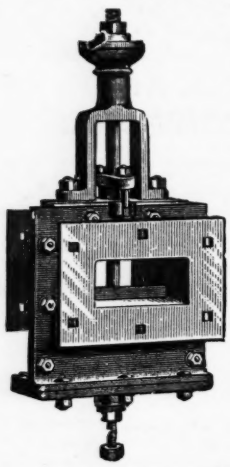

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